FLIGHT
The AIRCRAFT ENGINEER & AIRSHIPS

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Founder and Editor: STANLEY SPOONER
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DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Feb. 28 ...	Lecture by Mr. Handley Page, C.B.E., at King's College, Strand, at 11 p.m.
April 18 to May 2	Seaplane Competition at Monaco
May 22 and 23	Aviation Competition at Juvisy in connection with Fêtes de Paris
June 1 ...	Air Ministry Competition (Small Type Aeroplanes), Martlesham Heath
July ...	S.B.A.C. International Aero Exhibition at Olympia
July (mid.)	Seaplane Contests at Antwerp
Aug. 1 ...	Air Ministry Competition (Seaplanes) Felixstowe
Aug. (end of)	Schneider International Race, Venice.
Sept. 1 ...	Air Ministry Competition (Large Type Aeroplanes), Martlesham Heath
Sept. (end of)	Gordon-Bennett Aviation Cup, France.

EDITORIAL COMMENT

IN last Monday's *Daily Mail* there appeared a short article by "A Service M.P." which is very much to the point at the present moment, when the Government is starving the fighting Air Service to death, and has no policy in regard to the fostering of civil aviation. The first purpose of the writer is to criticise the new proposals for the Territorial Force, but he has some rather striking things to say regarding

"The Next War"

the next war, and the part that will be played in it by the aerial services of the belligerents. He says that up to eight years ago war was an affair of two dimensions. Armies and fleets moved in a plane. Movement was along a straight line on a level surface. The conquest of the air made a three-dimensional fighting force possible. In the very near future the only fighting factors that will count will be the armies and navies that fly. Mr. Churchill and his "brass hat" friends have been brought up among foot soldiers and horse soldiers. They cannot understand the air soldier, his method of fighting, and his command of all war in the future. They are angry, and are trying to suppress what they cannot understand. Thus we see the separate Air Service once more under the War Office, where it is being quietly strangled. In the past, sea navies fought for the mastery of the sea routes so that their countries' merchant ships could carry foot and horse soldiers to the shores of the enemy. In the next war the only use for Mr. Churchill's Territorial soldiers will be for the labour battalions. The war-hardened soldier of today sees that, and it is to be doubted if he will join the new Territorial Army. Its only use will be to provide well-paid billets for a certain number of military limpets in peace time. The money would be a hundred times better spent in building aeroplanes, civil and military, and in training airmen.

We cannot help thinking that it is rather a pity that the writer chose to veil his identity under a *nom-de-plume*, since his status as a Service member of Parliament would have lent added weight to what is an exceedingly strong and direct indictment of the present policy of Imperial defence as the Government and their advisers appear to visualise it. There is nothing new in the arguments, either as to their incidence or the manner of their presentation, but they are timely, nevertheless, if only for the fact that they demonstrate that what those who have studied the subject from within have believed for a long time is beginning to find acceptance from others. It is the sort of propaganda that is badly wanted to bring home to the public that, as the writer of the article well says, war has become an affair of three dimensions, and must be approached from a new standpoint accordingly. We have seen lately, in the shape of what purport to be reasoned criticisms from distinguished generals and admirals, that the Service mind, trained in two-dimensional war, is unable to grasp

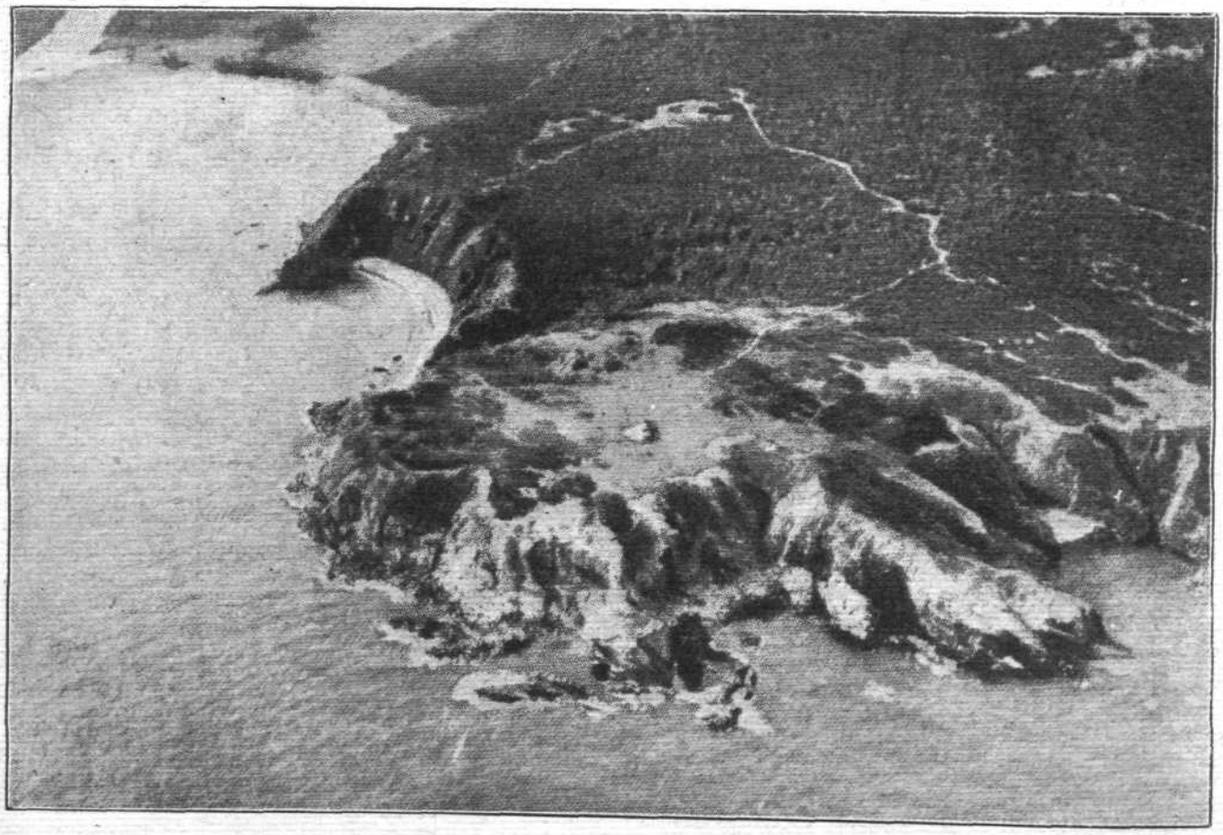
the salient fact that time brings change, and that no such vital change as has been brought about by the conquest of the air has ever affected the face of war. We are not even yet convinced that Mr. Churchill himself, favourably as he inclines to affairs of the Air, has grasped the possibilities of the future. It is very much to his credit that it was he who provided the Navy with an air service, which was in being at the outbreak of war. Also it must be remembered to his account that he has consistently helped and furthered aviation, civil and military, ever since the possibilities were first realised. We prefer to think that in the matter of present policy he is rather the victim of circumstances than willingly acquiescent in what is an altogether foolish policy, though at the same time we are not convinced of his conversion to the new thought. With this qualification, we unhesitatingly endorse the indictment brought against the Government by "A Service M.P."

* * *

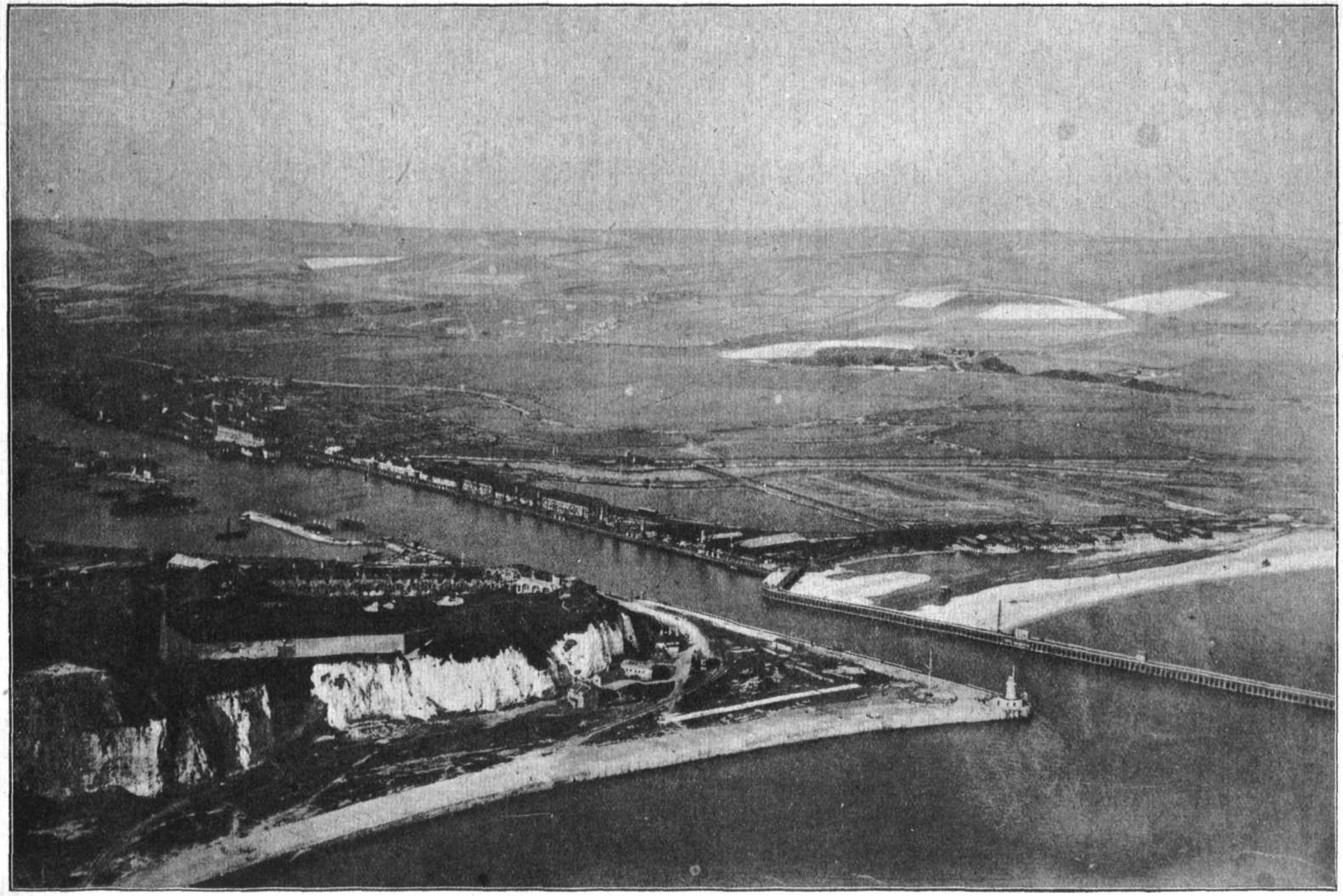
Civil Aerial Transport

Certain public references which have recently been made to the work of the Civil Aerial Transport Committee have brought Mr. Holt Thomas into the field again. In a letter to *The Times*, he points out what is required now is not a series of eulogistic references to the valuable work accomplished by the Committee, but an active constructive policy of encouragement. The Committee was appointed in May of 1917. It sat for a whole year of painstaking work, and laid before the Government a very complete Report embodying the collective opinions of the members, indicating what the position of the aircraft industry would be at the conclusion of hostilities, and what steps would be desirable to tide over the period of transition from war to peace, and to place it on such a foundation as would ensure its healthy progress. All the advice necessary was given by the Committee to the Government nearly two years ago. It explored the whole field, and foresaw post-War problems with absolute prevision. As Mr. Holt Thomas remarks, it is now becoming a habit for officials to pay verbal tribute to the work of the Committee, but it is definite, constructive action which is long overdue.

We confess we are becoming a little tired of continually emphasising the derelictions of the Government in the matter of civil aviation—to say nothing of the cheese-paring policy being pursued in regard to the fighting Air Service—and we doubt not our readers will begin to share this feeling with us. But we should consider it to be much less than the duty we owe to the movement if we did not keep continuously hammering away at the subject. It is only by so doing that the necessary volume of public opinion to force the hands of the Government can be created. It has become perfectly obvious that not only has the present Government no aerial policy at all, but that it does not intend to formulate one. It has been warned time and again by those who know that the future of defence lies in the air. It has a bare twelvemonth behind it and the lessons of the War. Between them these several factors should, and would, have caused a Government with ordinary prevision and honesty of intent to have thought out and announced a definite air policy long ere this. That is so perfectly plain that we are coming round to the conclusion that, as we have said, there is not only no policy but no intent. We hear a great deal from time to time of a desire to encourage and foster aviation, but nothing is done, nothing is said, which bears the merest semblance of definiteness. The present Government knows it cannot last for ever. It is improbable that we shall be involved



The coast of the Black Sea, taken from an aeroplane



Newhaven Harbour as seen from an Avro aeroplane

in another great war for probably a quarter of a century, and it begins to look as though they intended to leave the future to make provision for defence. We know it is an unpleasant deduction, but what else is there left for us to believe? Once again we must emphasise the point that it becomes clearer every day that nothing but the force of public opinion will move the Government to carry out a sane and definite air policy.

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To India and Back

The offer some time ago by the *Daily Express* of a prize of £10,000 for the first flight to India and back with a cargo of 1,200 lbs. strikes us as being a very practical idea indeed. Aviation has arrived at a stage now when it is no longer necessary merely to demonstrate that aircraft are capable of travelling long distances in safety. That has been amply shown by the Atlantic flights, both of the Vickers-Vimy machine and the R 34, and the more recent flight to Australia. What the public wants to know now is that aircraft are equally capable of being used commercially, for the carriage of goods as well as passengers. From that point of view alone the *Daily Express* competition, the regulations governing which were published in our last issue, is excellent. There are other points about it which seem to be eminently practical. There is the proviso that aircraft may be changed *en route*, which again strikes us as excellent. We do not think for a moment that long-distance services such as that from London to Karachi will, at least for many years to come, be served in any other way than by relays of machines, and it is just as well, therefore, that this competition should be carried out on lines approximating as nearly as possible to the actual conditions which will obtain on commercial services. In fact, we would almost rather it had not been stipulated that the pilot and crew may not be changed, since it is scarcely conceivable that any commercial service would under ordinary conditions run the risks attendant upon exposing pilots and crews to the prolonged strains imposed by the journey to India and back. However, that is possibly a minor point in the competition rules, especially as we have seen that the aerial voyage to Australia is within the compass of a single crew. We sincerely congratulate the *Express* on a public-spirited offer which cannot fail to do lasting good to the cause of commercial aviation.

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Coming Air Legislation

AMONG the legislation foreshadowed in the King's Speech at the opening of Parliament on Tuesday was a Bill for regulating the navigation of the air.

Mentioned in Dispatches

IT was announced in a supplement to the *London Gazette*, dated February 3, that the names of the undermentioned have been brought to the notice of the Secretary of State for War by the General Officer Commanding the British Military Mission, for valuable and distinguished services rendered in connection with the operations in South Russia:—CRESSWELL, 406062, 2nd Aircraftman A., 30th Squadron, R.A.F.; JUDGE, 49087, Ldg. Aircraftman W. E., 30th Squadron, R.A.F.

Amendment to Appointed Aerodromes List

THE Air Ministry announces that the following Notice to Airmen (No. 12) has been issued:—

"The Secretary of State for Air has issued directions under Schedule VIII, paragraph 1 (1), of the Air Navigation Regulations, 1919, whereby from January 28, 1920, the aerodrome at Cricklewood, Middlesex, is added to the list of Appointed Aerodromes, and the aerodromes at New Holland, Lincolnshire, and Hadleigh, Suffolk, are removed from the list.

"The full list of appointed aerodromes in the United Kingdom now stands as follows:—

Cricklewood, Middlesex.
Lympne, Kent.
Hounslow, Middlesex."

Permits Necessary for Fixed Balloons

UNDER an amended Air Navigation Regulation a fixed balloon may not be flown except by written permission of the Secretary of State, and on conditions which he may prescribe.

The Air Ministry Staff

FROM an official statement issued last week, it appears that the total staff at the Air Ministry on December 1 last was 2,538, which represents an increase of 137 over the figures for November 1. The figures have gone up through the taking over of the staffs of the Airships Department and the Meteorological Office.

East Fortune Aerodrome Closed

WITH the departure of the airships R 34 and NS 7 for Pulham on the morning of February 5, the East Fortune air station came to an end as an airship base, and it will now be closed down and handed over to the Disposal Board.

Temporarily, the R 34, will remain with the R 33 and several smaller craft of the semi-rigid type at Pulham, but the rigids will be removed shortly to the new aerodrome at Howden (Yorkshire), Pulham being retained then for use with the "blimps" and NS airships.

◈ ◈

Air Work on Indian N.W. Frontier

IN a telegram received from the North-Wester Frontier, it is stated that during the advance of the Derajat column on February 1 large parties of the enemy, numbering up to 600, were seen in the vicinity of our troops. The enemy sniped continuously, but never closely. Our casualties were about 20. Aeroplanes had excellent targets, and claim very good results, in which the howitzers and guns shared. The Mahsud losses from air operations are estimated at 20 killed and 50 severely wounded.

Maps to Help Aviators

LECTURING on "Characteristics of the Ground as Seen from the Air" before the Royal Geographical Society on Monday Capt. H. Alan Lloyd, who served in the Intelligence Department, said it was apparent after the Battle of the Somme that the liaison between the A.F. and the Army was not close enough, and early in 1917 arrangements were made by which the information could be collated and quickly distributed. The difficulty of finding very small objectives was so great that at one time as much as 50 per cent. of the flying was useless. In order to meet this difficulty, the lecturer sub-divided the Western Front into 13 different types of country to enable the flying officers to see where they were.

By means of lantern slides, Capt. Alan Lloyd described the various types of country and suggested in conclusion that every town should be so pictorially represented on the maps that the moment an aviator saw the town through a thin patch of clouds he should be able to recognise the outstanding features of the place.

Cargo Transport in Africa

IN a lecture before the African Society on February 5 on Transport in Africa, Capt. Frederic Shelford said that for carrying commercial loads in Africa at a cheap rate aeroplanes could not be considered. It seemed, he remarked, ungracious to dismiss aeroplanes so airily when they performed fresh wonders every day, but he dismissed them only as cargo carriers. For special purposes, such as scouting, exploration, and rapid mail service from London to Paris or Brussels, they were invaluable.

As an example of a case in which an aeroplane would have been welcome, he mentioned that a few years ago he led an expedition to Lake Magadi, the Soda Lake, in British East Africa, and had to traverse about 120 miles of waterless, difficult, and dangerous country. As the party was large, it had dozens of ponies and gun-bearers and scores of natives The trip cost thousands of pounds, and the expedition took six days to reach the lake and six days later to return, whereas with a modern aeroplane of fair size they could have flown over in one day between lunch and tea.

Commercial transport by river Capt. Shelford also ruled out, and he maintained that railways remained the most practical and economical of all means of transport.

FLIGHT

SOME FOKKER MILESTONES

ALTHOUGH several of the Fokker machines, including the early monoplane, the triplane, and the D VII, have been very fully described in FLIGHT, from material gathered by the examination of captured machines, the following brief references to the Fokker machines, translated from *Flugsport*, have been considered of sufficient interest, as they deal with types with which we were not so intimately acquainted :—

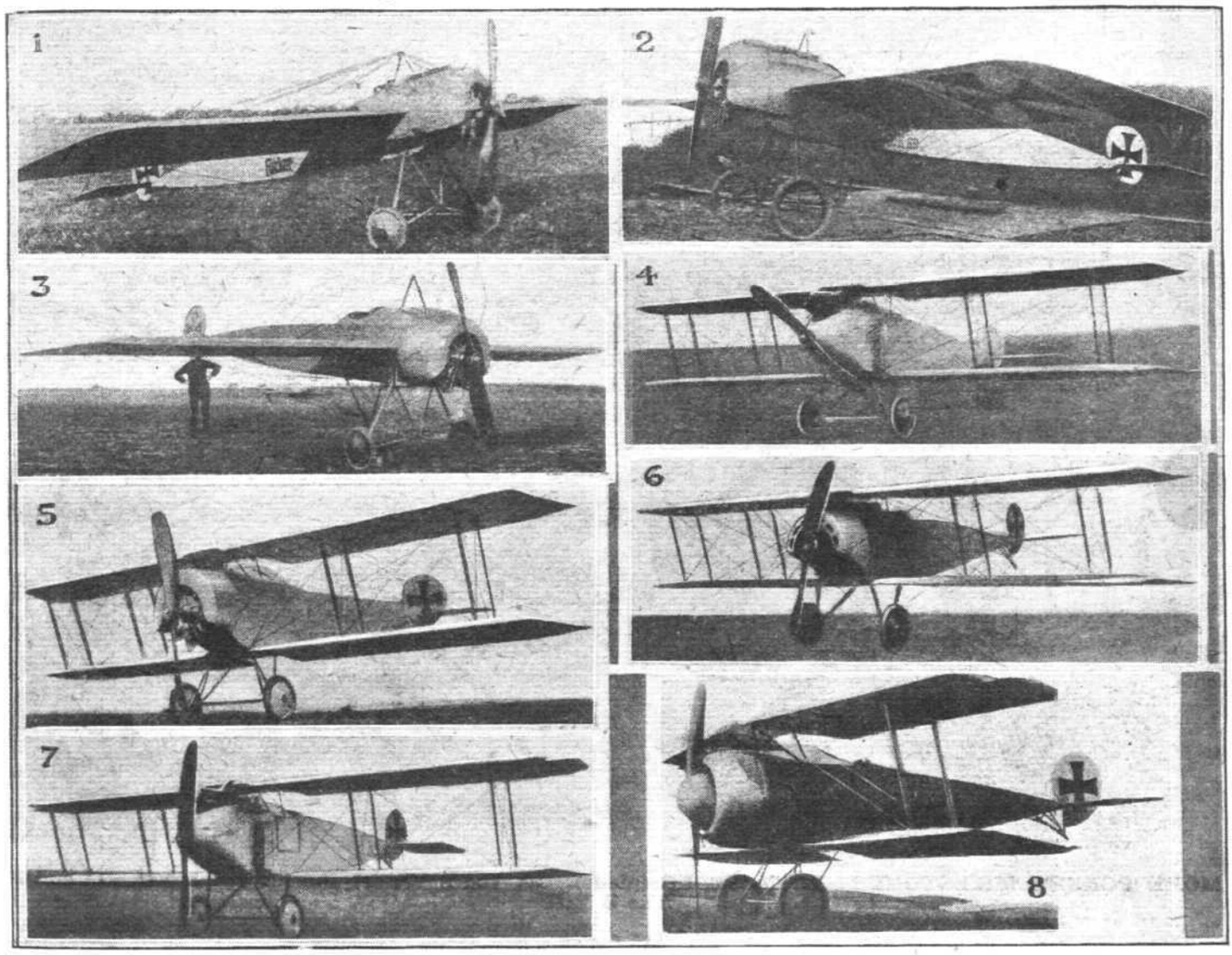
"The Fokker single-seaters have had the supremacy of the air at the front for long periods ; so much so that at one time every German fighting machine was called a Fokker, and that the name Fokker has not infrequently been stated in enemy *communiqués*. Furthermore, at the Armistice, our enemies demanded the handing over of all 'D VII aeroplanes,' by which was meant the Fokker type D VII.

"In May, 1915, the Fokker type E I was produced (Fig. 1). The prototype of this machine was the type on which Fokker and Kutner before the War surpassed all the stunts which the Frenchman Pegoud did on his Blériot monoplane. The armament of the Fokker E I consists of a fixed machine gun firing through the propeller by means of the Fokker interrupter-gear. It should be mentioned that in this sphere Fokker has had as great influence as he had in the construction of fighting machines. Bölcke, Immelmann, Baldamus, and others have secured some of their greatest successes with this type of interrupter-gear. The power-plant of the E I consists of an 80 h.p. Oberursel rotary engine. The *fuselage* construction is that characteristic of all Fokker single-seaters. It consists of a framework of steel tubes welded together and cross-braced in each bay by diagonal wires. The undercarriage of this, as well as of the following one, is unusual inasmuch as the shock-absorbing devices are placed in the *fuselage*. Lateral control is by means of wing warping. The wing bracing is in the form of four cables on each side, and one external drift cable.

"Fig. 2 shows the Fokker type E II, which is practically of the same construction as the E I, as is also the Fokker E III, which made its appearance in the middle of 1915. In the Fokker E III the armament consisted of two machine guns. The engine was a 100 h.p. Oberursel. The performance was considerably improved, as will be seen from the accompanying table of data for the various types.

"The Fokker type E IV (Fig. 3), generally speaking, is of the same general construction and design as the previous types. This machine made its first appearance in August, 1915, and is mainly characteristic on account of the fact that it was fitted with three machine guns. This arrangement was dropped later, as it was found that it is not so much the number of guns and the quantity of shots which count, as it is their quality, that is to say, good aiming. If the aim is good two machine guns are quite sufficient. Later on a 160 h.p. Oberursel engine became available. The engine power available at the time had reached its limit in the Fokker E IV. More powerful engines, suitable for single-seater fighters, were not then available. In order further to improve the climb, which is always the deciding factor in the superiority of a fighting machine, the Fokker works, from that time on, turned their attention to the design and construction of biplanes.

"The Fokker type D I, shown in Fig. 4, is characterised by a 120 h.p. Mercédès engine. The radiators, which were of the narrow box type, were mounted on the sides of the *fuselage*. The control surfaces resembled those of the earlier types, but a fixed vertical fin was mounted above the *fuselage* in front of the rudder. The main planes are of the warping type, and there are two pairs of interplane struts on each side.



SOME FOKKER MILESTONES : 1. The Fokker type E I monoplane. 2. The E II. 3. The E IV. 4. The D I biplane. 5. The D II. 6. The D III. 7. The D IV. 8. The D V

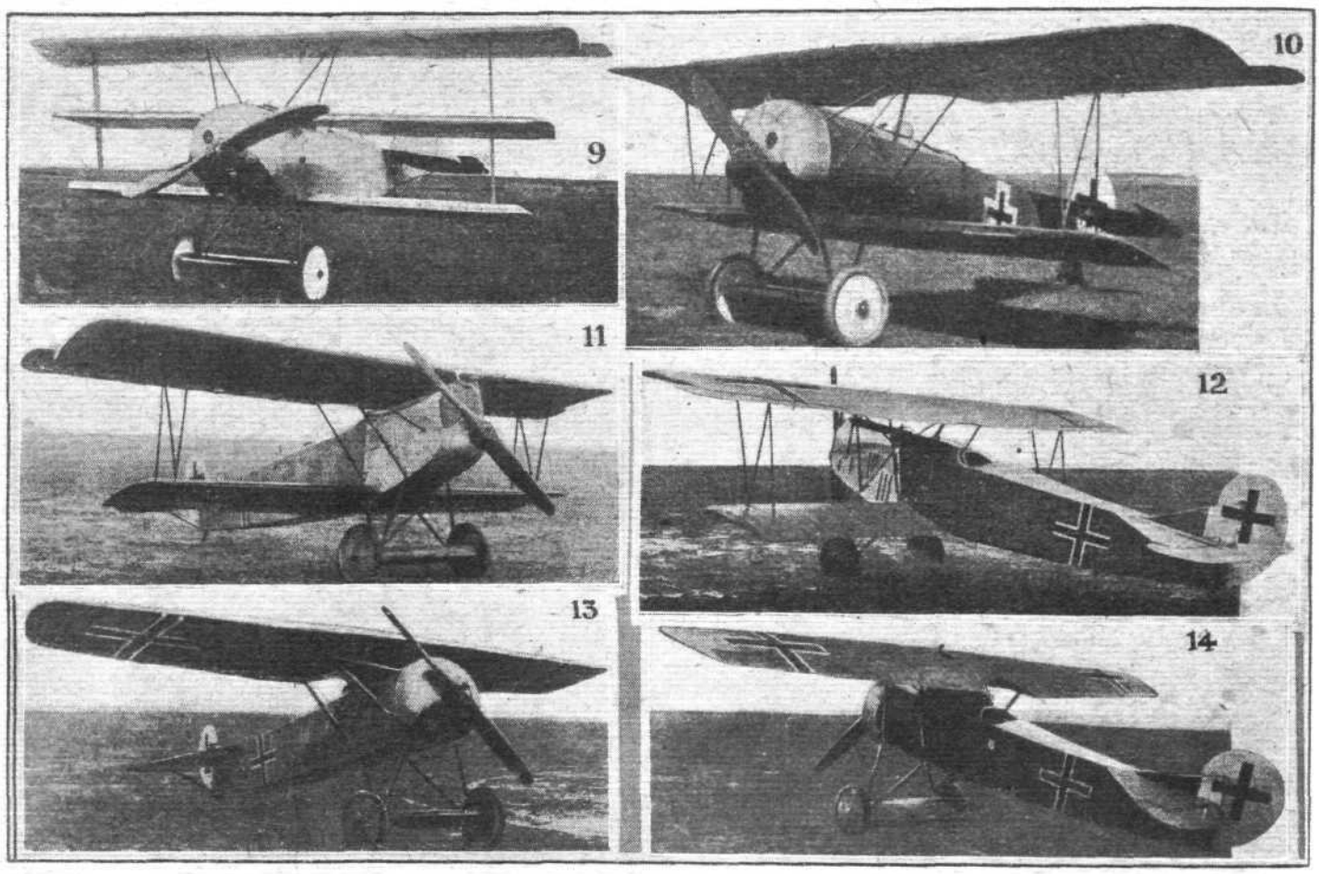
With regard to the performance of the Fokker D I, it should be pointed out that this was not superior to that of the Fokker E IV, but on the other hand, the D I was very easy to land.

"The Fokker type D II (Fig. 5) differs from the D I in that it is fitted with a 100 h.p. Oberursel rotary engine. In this machine there was no fixed vertical fin, but otherwise the control surfaces and main planes resembled those of the D I. The undercarriage differs somewhat from the normal one, as exemplified by the D I, inasmuch as it has three instead of two chassis struts on each side. The performance is better than that of the Fokker D I, and is approximately the same as that of the E IV.

"A development of the last two types is the Fokker D III which appeared about the middle of 1916 (Fig. 6). This machine represents a considerable improvement in performance. The armament consists of two machine guns. It is on this type that Bölcke has had some of his greatest successes, especially in the neighbourhood of Verdun. The power plant was a 160 h.p. Oberursel, which represented the highest power available at that date for an engine suitable type. The wing structure is braced by two lift and two anti-lift cables, and also by drift cables running to the upper ends of the front struts. These two cables also act to a certain extent as lift cables. The undercarriage construction resembles that of the Fokker D II with three struts on each side. The Fokker D V has a greater speed than its prototypes, and is also distinguished by a 'spinner' over the propeller boss as well as by a stream-line cowling round the engine. Only a small space between the cowl and the spinner is left open for the entry of the air. A particular feature of the Fokker D V is its extraordinary manœuvrability, which should render it very useful as a sporting machine. At the fighting schools the Fokker types D III to D V were employed right up to the end of the War.

"Then followed a long period which was devoted to experiments, caused by the vast increase in the demand for performance and strength, which was very urgent at that time.

"These experiments resulted in the construction of the Fokker Dr. I, shown in Fig. 9. This machine was very much



MORE FOKKER MILESTONES: 9. The Dr. I (triplane). 10. The D VI. 11 and 12. The D VII. 13 and 14 The D VIII

or single-seater machines. The undercarriage of this type shows a return to the usual form. A feature of the wing bracing of the Fokker D II and D III machines is the provision of two external drift cables attached to the upper and lower ends of the front inner inter-plane struts. Although wing warping was the standard, some of the type D III Fokker machines were provided with *ailerons*. The reason for doing away with wing warping in favour of *ailerons* is chiefly that the breakage of a cable not only weakens the wing bracing, but actually renders the machine uncontrollable. Also the ever-increasing demands for strength and rigidity could not be provided in wings of the warping type.

"The Fokker type D IV, shown in Fig. 7, is the first single-seater in Germany to employ the 160 h.p. Mercédès engine, which type held a leading place in single-seater fighters for a long time. The Fokker D IV has a greater climb than any of the previous machines. Lateral control is by means of *ailerons* of the balanced type.

"In October, 1916, the Fokker D V shown in Fig. 8, made its appearance. As distinct from previous Fokker single-seater biplanes, the D V has only one pair of struts on each side. The wings are staggered and have a certain amount of sweep-back. The *ailerons* are balanced as in the previous feared by the enemy, and was to be found at the front up to the summer of 1918. The Fokker Dr. I represented an increase in speed, climb and manœuvrability not hitherto attained. This machine represented a leap forward compared with any previous ones. Rittmeister Frhr. Von Richthofen and his squadron have, as is well known, had enormous successes with the Fokker triplanes. Typical of this machine is the employment of cantilever wings of which only the top plane is fitted with *ailerons*.

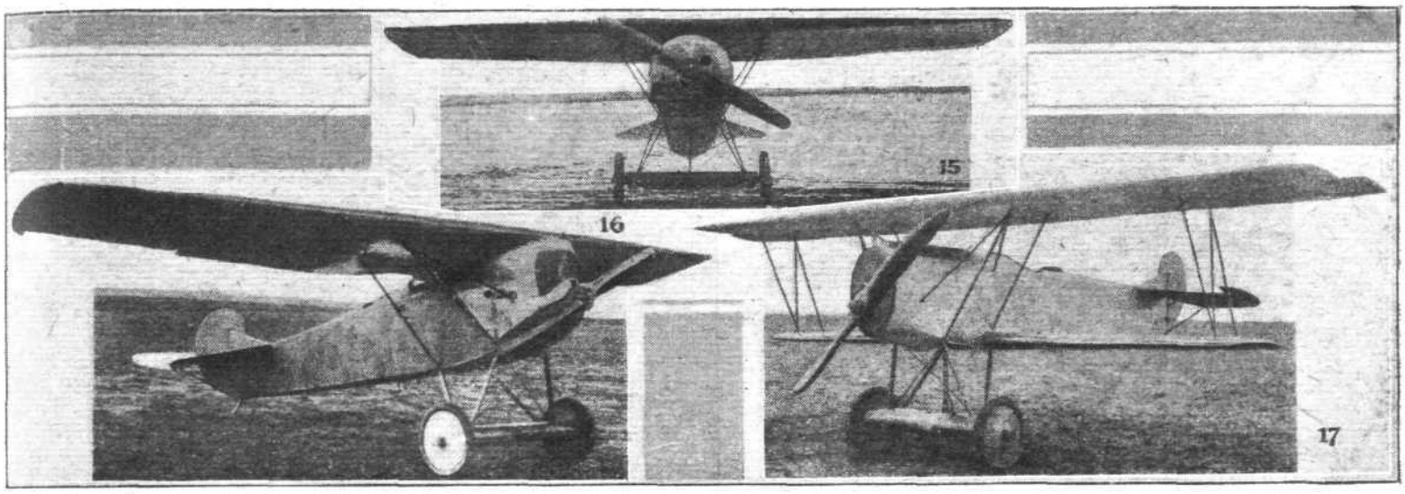
"Only the centre section is braced with diagonal cables. In addition the three planes are connected by a narrow strut on each side. It is worthy of note that the machine is quite capable of flying without these struts, and that the first specimens which arrived at the front were, in fact, without them. Remarkable is also the employment of a large fixed tail plane and the fitting of a fourth plane in the form of a wing-sectioned casing round the wheel axle. The power plant of these very light machines is a 110 h.p. Oberursel engine.

"A step between the Fokker triplanes and the Fokker D VII, which followed later, is formed by the Fokker D VI, shown in Fig. 10. As in the triplane, this machine has a fixed tail plane, but no vertical fin in front of the rudder. A

characteristic feature of this machine is formed by the centre section *cabane*, which is in the form of struts, thus doing away with cable bracing in this part of the machine also. It should further be noticed that the interplane struts are braced by means of a diagonal strut instead of cables. By this arrangement the erecting of the wings is very much simplified. Rigging and trueing-up is done by means of telescopic adjustment of the incidence strut. The extraordinarily small chord of the *ailerons* will be noticed, but it should be pointed out that these were found to be quite effective enough. This has to do with the air flow round the very deep wing section. The engine was a 110 h.p. Oberursel. The Fokker D VI has been employed on the Italian front as well as for home defence.

"In February, 1918, the Fokker D VII made its appearance. This machine was the result of a series of no less than 22 experimental machines. It is worthy of mention rudder. As an example of the diving speed and strength of the Fokker D VII, it might be mentioned that the writer in July, 1918, was able to come down from a height of 1,000 metres, in a vertical dive with a Fokker D VII, which was on fire. It was possible for the writer, by letting the machine turn over on reaching the ground, to get clear of the wreck, which was later totally burnt.

"In April, 1918, the Fokker D VIII monoplane, shown in Figs. 13, 14 and 15, made its appearance. This, machine which was provided with an Oberursel engine of 140 h.p., represented the last word in single-seater fighters. The wings are of the cantilever type, and are placed above the *fuselage*. A peculiar feature of this machine is the employment of three-ply for the covering, experiments with which had already been made in previous Fokker experimental machines. Peculiar is also the extremely small size of the *ailerons*. The wing covering is doped with a special pre-



MORE FOKKER MILESTONES: 15. The D VIII. 16. The V 29. 17. The V 36

Table of Weights, Dimensions and Performance of Fokker Machines

Type.	Engine and h.p.	Weight. Empty (lbs.).	Weight. Loaded (1½ hrs. fuel).	Area (sq. ft.).	Wing loading (lbs./sq. ft.).	Power loading (lbs./h.p.)	Length o.a.	Span.	Height.	Speed.	Climb (in mins.) to feet. 3,300.	6,600.	9,900.	13,200.	16,500.	19,800.
							ft. in.	ft. in.	ft. in.	m.p.h.						
E. I ..	O. 80	787	1,240	172	7·2	15·5	22 3	29 6	9 6	80·5	7	20	40	—	—	—
E. II ..	O. 100	880	1,340	172	7·8	13·4	23 10	31 5	7 11	86·8	5	15	30	—	—	—
E. IV ..	O. 160	1,025	1,590	172	9·2	9·95	24 10	33 0	9 2	99·0	3	8	15	25	—	—
D. I ..	M. 120	1,020	1,475	236	6·25	12·3	18 10	29 10	7 5	93·0	5	11	16	28	—	—
D. II ..	O. 100	845	1,270	193	6·55	12·7	21 2	28 10	8 5	93·0	4	8	15	24	—	—
D. III ..	O. 610	995	1,560	215	7·27	9·75	20 10	29 10	7 7	99·0	3	7	12	20	—	—
D. IV ..	M. 160	1,335	1,850	226	8·2	11·6	20 10	32 0	8 0	99·0	3	5	12	20	30	—
D. V ..	O. 100	800	1,245	167	7·5	12·45	20 00	28 10	7 7	105·5	—	—	19	—	—	—
Dr. I ..	O. 110	825	1,255	172	7·27	11·45	19 00	22 2	9 0	124·0	1·75	3·75	6·5	10	14·5	—
D. VI ..	O. 110	865	1,283	184	7·05	11·8	19 6	25 5	9 3	124·0	2·5	5·5	9	13·5	19	—
D. VII..	B. 185	1,515	1,995	217	9·2	10·6	23 0	29 4	9 8	124·0	1·75	4	7	10·2	14	18·7
D. VIII	O. 140	890	1,330	115	11·6	9·5	19 5	27 6	9 4	124.0	2	4·5	7·5	10.7	15	19·5
V. 36 ..	B. 185	1,400	1,915	189	10·15	9·85	21 4	29 6	10 1	124·0	1·75	4	6·75	10	13·5	18·2

O. = Oberursel M. = Mercédès. B. = Bavarian Motor Works.

that the experimental Fokker machines with cantilever wings date back as far as 1916. The Fokker D VII, shown in Figs. 11 and 12, has proved itself superior to all other types, including such enemy machines as the Spad single-seater. It was at first fitted with a 160 h.p. Mercédès engine, but soon after also with the 185 h.p. Bavarian Motor Works engine. This efficient engine improved the performance of the Fokker D VII considerably. The employment of a fixed water-cooled engine made the machine especially suitable for the hard wear and tear of work at the front.

"Characteristic of the Fokker D VII is the nose radiator, which even at great heights made the life of the pilot bearable. The main planes are so staggered that the view is very good. The machine-gun arrangement was such that the pilot had easy access to them during flight, as they could be reached from his seat. With regard to the control surfaces of the D VII, it should be pointed out that in addition to the fixed tail planes there was also a fixed vertical fin in front of the paration, which renders them weather-proof. The strength of the Fokker D VIII is even greater than that of the Fokker D VII. Thus loading tests with 24 persons on the wings were carried out in the presence of Mr. Fokker himself. The special advantage of the Fokker D VIII for work at the front was the excellent view, which was far better than that obtainable in any other type. For use after the War the Fokker D VIII may be considered the ideal sporting machine, all the difficulties and drawbacks which attend every new form of construction having long ago been eliminated from the machine.

"A number of other Fokker single-seaters have been produced, partly experimental machines and partly military machines, which did not, however, arrive at the front owing to the Armistice of November, 1918. In Fig. 16 is shown the Fokker type V 29, which, generally speaking, resembles the Fokker D VIII, but which has a fixed water-cooled engine and a nose radiator. Here again one notices a change-

over from rotary air-cooled to fixed water-cooled engine. The problem as to whether the water-cooled or the rotary engine is the better can scarcely be stated as a general rule, but appears to be more a question of the particular requirements at the moment.

"A type which would have had an extraordinary influence on fighting in the air was the type V 36, shown in Fig. 17. This machine has its petrol tank placed in the streamline casing round the wheel axle. The petrol is forced to the engine under pressure. Practical tests, of which cinematograph films have been taken, show that with this arrangement of the petrol tank, the pilot is almost sure to remain uninjured in case of the tank catching fire. Especially does it appear that the danger of the pilot's clothing or the parachute catching fire is entirely eliminated by this arrangement.

"The performance of the machine has in no way suffered from this arrangement of the tank. The V 36 differs from the Fokker D VII, which also had a 185 h.p. Bavarian Motor Works type IIIa engine, in that it has an oval nose radiator, which is not pointed. It is also considerably lighter, and the climb is superior to that of the Fokker D VII, while its ceiling is even greater than that of the Fokker triplanes.

"How the sports machine of the future has been influenced by the design of fighting machines is proved by the fact that the Fokker works already have brought out sporting machines of the cantilever monoplane type. The power plant is a 50 h.p. rotary or a 30 h.p. fixed engine. The length of these types is only about 4 metres, and their span is about 6 metres. Already speeds of up to 120 kilometres per hour have been reached with these machines."

Without in any way denying the advantages, for certain classes of machines, of the cantilever wings, we should like to point out that although these are, nowadays, chiefly associated with the German firms of Fokker and Junker, the Germans were not the first to design and build aeroplanes without external wing bracing. Quite in the early days of flying the French Antoinette firm built a monoplane—a very large one at that—which counted among its many unique features that of cantilever wings.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE FLYING SERVICES FUND.

A MEETING of the Flying Services Fund Committee was held on Monday, February 2, 1920, when there were present:—Group-Captain C. R. Samson, C.M.G., D.S.O., R.A.F., in the Chair, Mr. Chester Fox and the Secretary.

Applications for Assistance.—Thirty applications for assistance were considered and grants and allowances were voted amounting to £456.

Committee.—Lieut.-Col. Alan Dore, D.S.O., was co-opted to the Committee.

JACQUES SCHNEIDER MARITIME CUP.

GENERAL CONDITIONS FOR 1920.

The competition will be over a distance of 200 nautical miles, competitors carrying a load of 300 kilograms of unutilizable ballast.

The competition will take place over the sea in a closed circuit of at least 5 nautical miles and situated outside any port or closed harbour.

Alightings are allowed.

The start and arrival will be made in full flight.

Competitors will start at intervals fixed by the officials.

The order of starting will be drawn by lot.

The competition will take place between April 1 and September 30.

The competition will close at the official hour of sunset.

Before the start the officials will hand to each competitor two copies of the rules together with the final regulations, one copy of which, signed and approved by the competitor, must be handed back to the officials.

The competition proper will be preceded by an eliminating test of navigability, as follows:—

Navigability Test.

1. Each machine, provided with its load of 300 kilograms of ballast will accomplish in a closed circuit (which may be the whole or part of the circuit for the competition proper) a course of several nautical miles, the length of which will be fixed by the officials.

2. After having taxied over the line of departure, the machine will rise and continue the course in flight. During this test he must taxi over a distance of 300 metres, the limits of which will be indicated by two buoys. Having accomplished this, he must rise, complete the circuit and alight again before the line of departure which he will pass taxying.

3. The navigability test will take place for all competitors during the week preceding the competition for the cup, in the order fixed by the drawing of lots. When the eliminating tests are completed, the officials may, if they think proper, authorise the competitors who have not carried them out to their satisfaction to commence the tests a second time forthwith.

4. Each machine competing for the cup must be the same in all respects as when it started for the eliminating test.

In the event of a machine being damaged during the eliminating test, it may undergo the necessary repairs, provided the machine remains the same in all respects as when it started.

Date and Place of the Competition.

The competition for 1920, which will be organised by the Aero Club of Italy, will be held at Venice towards the end of August or at the beginning of September.

THE FLYING SERVICES FUND

(*Registered under the War Charities Act*, 1916)

Administered by the Royal Aero Club

For the benefit of *Officers, Non-Commissioned Officers and Men* of the ROYAL AIR FORCE who are incapacitated while on duty, and for the widows and dependants of those who are killed or die from injuries or illness contracted while on duty.

Honorary Treasurer:
The Right Hon. LORD KINNAIRD.

Committee:
H.R.H. PRINCE ALBERT, K.G. (*Chairman*).
Lieut.-Col. A. DORE, D.S.O.
Mr. CHESTER FOX.
Squad. Leader T. O'B. HUBBARD, M.C., R.A.F.
Squad. Leader C. E. MAUDE, R.A.F.
Group Capt. C. R. SAMSON, C.M.G., D.S.O., R.A.F.

Secretary:
H. E. PERRIN.

Bankers:
Messrs. BARCLAYS BANK, LTD., 4, Pall Mall East, London, S.W. 1.

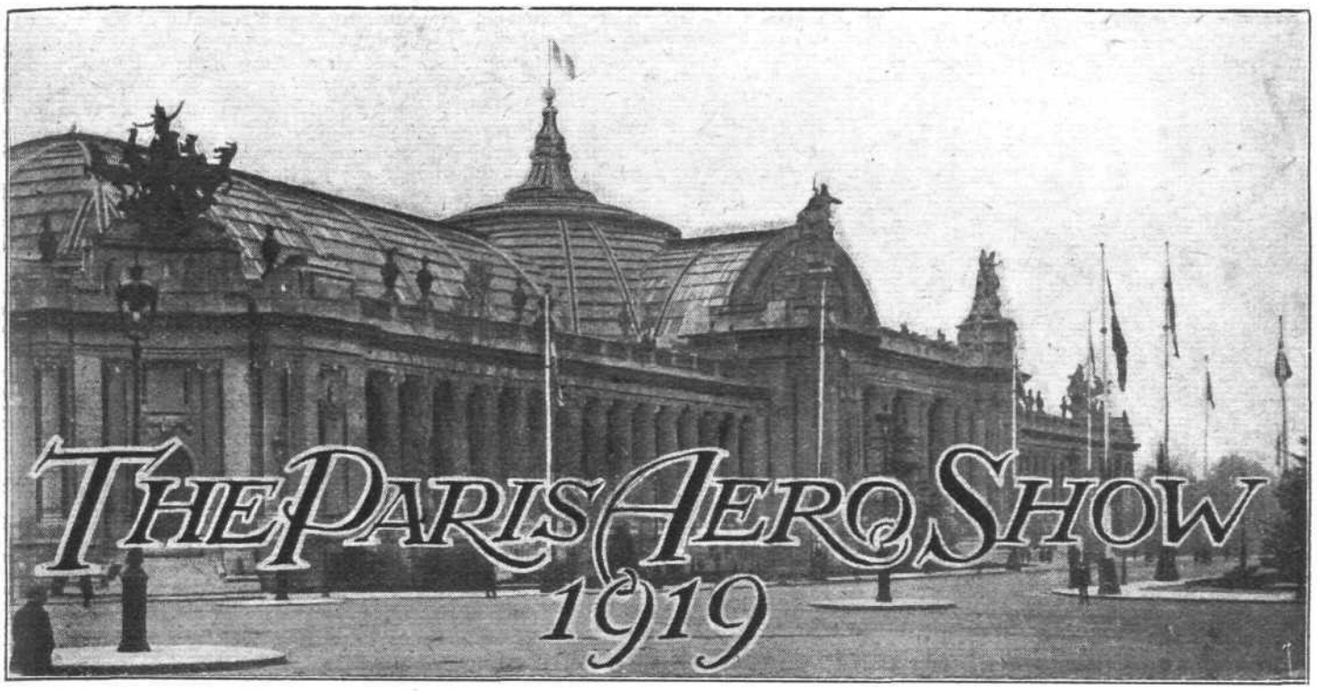
Subscriptions:	£	s.	d.
Total subscriptions received to January 16, 1920..	16,964	6	7
C. H. Alderson	2	2	0
Donation, from the P.R.I. Fund of the F.A.R.D., Royal Air Force, Donibristle	5	0	0
Total, February 10, 1920	16,971	8	7

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

A Vision of the Future

SPEAKING at a meeting of the Society of Engineers on Monday the newly elected President, Mr. Burnard Green, said it was quite possible that we should see in the near future hermetically-sealed air liners travelling at the rate of 227 miles an hour.

FLIGHT
AIRCRAFT ENGINEER AIRSHIPS



SOME BRIEF NOTES DEALING WITH AERO ENGINES

BY THE TECHNICAL EDITOR

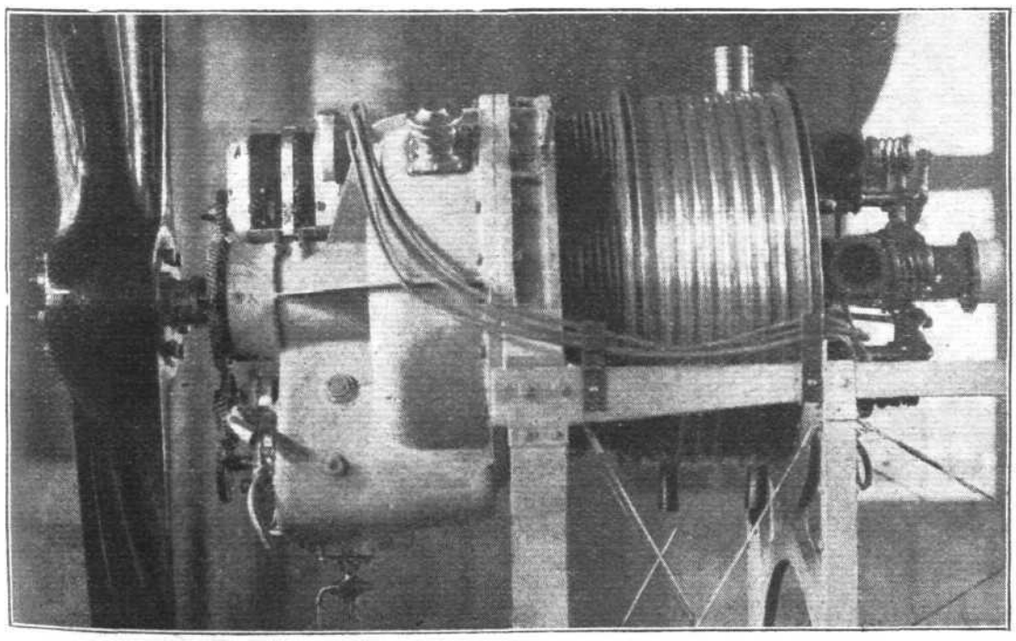
(*Concluded from page* 149.)

"La Meuse"

It was a regrettable fact that on many of the stands at the Paris Show there were interesting exhibits about which those in attendance appeared to know little or nothing. Printed information of real value was scarce, a notable exception being the Fiat firm, whose instruction books on the different types might well be taken as models by other firms. Among the stands on which little or no information was available was that of "La Meuse" Société Franco-Belge, which firm exhibited an aero engine of the type in which the cylinders lie parallel to the crankshaft. Beyond the fact that this engine had six cylinders with a bore and stroke of 120 mm. and 140 mm. respectively, one could learn nothing. The really interesting part of the engine, *i.e.*, the mechanism transmitting the power from the parallel cylinders to the crankshaft, was hidden inside an aluminium casing over the front part of the engine. The exhaust valves and the induction pipe were at the rear end, but as to the exact location of the inlet valves nothing could be discovered, as these were hidden inside the circular copper water-jacket. The engine is credited with a power of 125 h.p. The compactness of this type of engine has much to recommend it, and if the transmission-gear is satisfactory there does not appear to be any reason why this form of engine should not be successful. It certainly has the advantage of taking up little space in the nose, or in the engine *nacelles*, of a machine.

The Napier Engines

Messrs. D. Napier and Son, Ltd., had not taken a special stand for their engines at the Paris Show, but three "Lions" were fitted on machines exhibited, *i.e.*, two on the Handley Page W 8 and one on the Airco 16. The Napier Lion is already well-known in this country, and a detailed description of the engine was published in our issue of December 25, 1919, to which we would refer readers for information. In the present issue we publish two views of the engine mounted in the Handley Page and in the Airco 16. Incidentally, although covering up most of the engine, the views give a good idea of the compactness of the design by showing the neat cowling with which the engine can be surrounded. In the case of the Handley Page the engine *nacelles* are circular,



The "Meuse" engine: The cylinders are arranged parallel to the crankshaft

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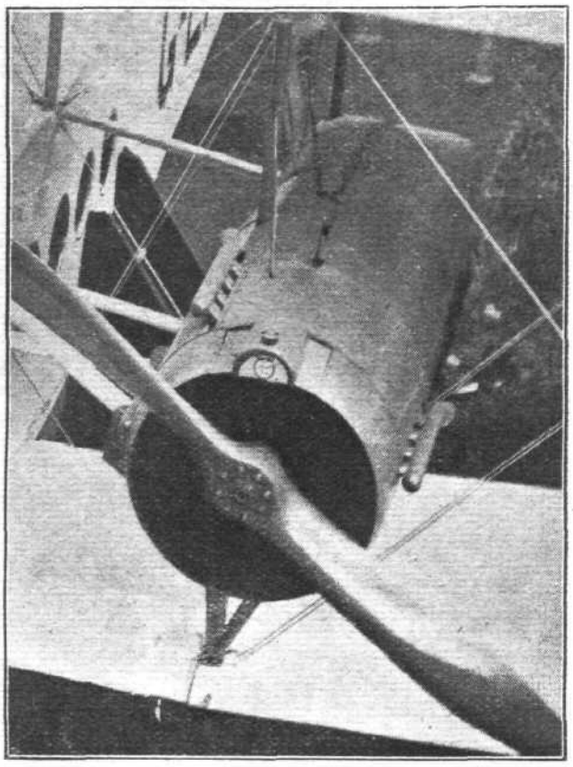
with the radiator in the nose, resulting in a very neat streamline casing, while in the Airco 16 the radiator is placed behind and slightly below the engine, an arrangement which also lends itself to a very clean design of nose.



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THE NAPIER LION: View from above, showing installation in a Handley Page W 8

Panhard et Levassor

Of the engines exhibited by this firm, two were of the ordinary Vee type, with 12 cylinders, while the third, the most interesting from the point of view of novelty, was of what may be described as the "double Vee" type, having four rows of cylinders of which the two outer rows are horizontal, the remaining two forming a Vee on top of the others. The smaller of the Vee types is rated at about 350 h.p., with 12 cylinders of a bore and stroke of 115 mm. and 170 mm. The rated power, it is stated, is delivered at a speed of 1,800 r.p.m., giving an airscrew speed, as a reduction gear is fitted, of 1,000 r.p.m. The second Vee engine was of 500 h.p., also 12-cylinder, bore and stroke 145 mm. by 165 mm., but with direct drive, the normal speed being 1,800 r.p.m. at, it was stated, "great altitudes." This probably means that the compression is very high.

The large double-Vee engine, of which we publish a photograph, has 16 cylinders arranged in four banks of four. The bore and stroke is 145 mm. by 170 mm. The cylinders are of steel, in separate water-jackets, and overhead valves, four to each cylinder, are fitted. The valves are operated by push rods from two camshafts placed in the angles between the outer vees. These two angles also accommodate the induction manifold. While the exhaust pipes of the two inner banks of cylinders are placed on the inside of the central Vee the pipes of the outer banks point downwards from the lower side of the horizontal cylinders. Two twin carburettors are mounted on the rear end of the engine, and four magnetos, two on each end, supply the current to two plugs in each cylinder.

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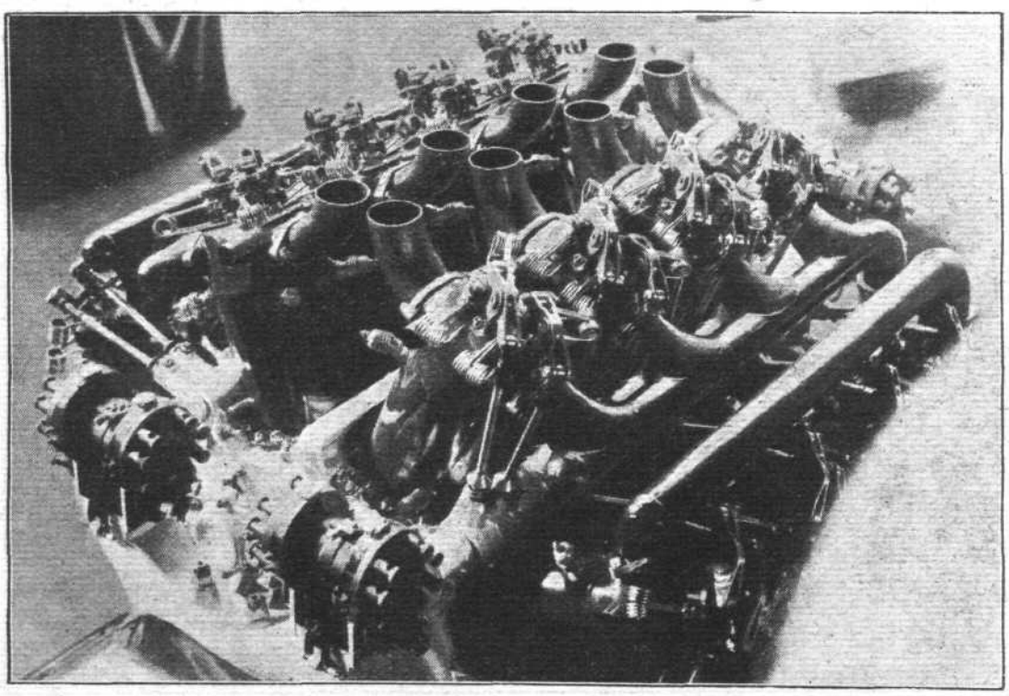
The Napier Lion installed in an Airco 16



The 16-cylindered Panhard-Levassor: Note the "double Vee" arrangement of the cylinders

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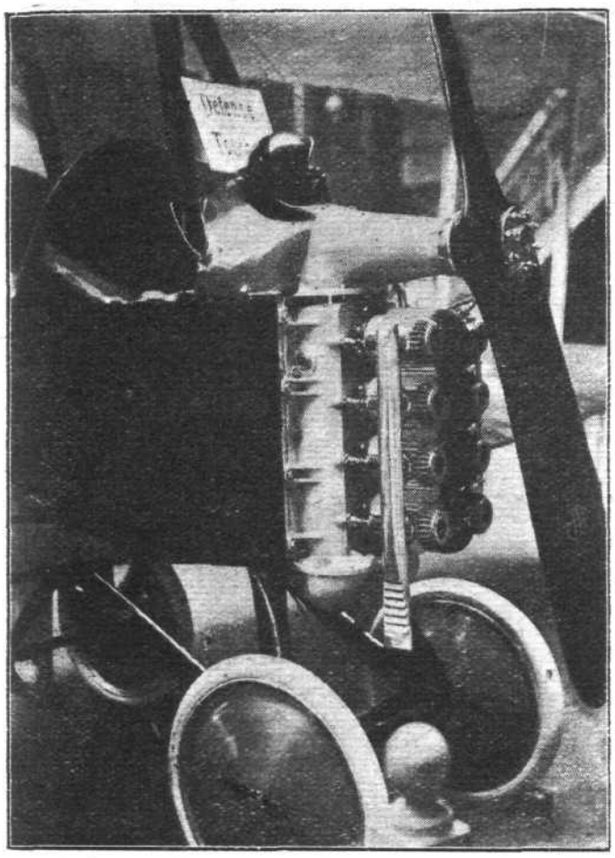
FLIGHT
AIRCRAFT ENGINEER AIRSHIPS

The Peugeot Engines

Two aero engines were exhibited by this firm. One of these was a 12-cylindered Vee type and the other had its cylinders arranged in the form of a letter X, that is to say, there are four banks at 90°. The former engine has 12



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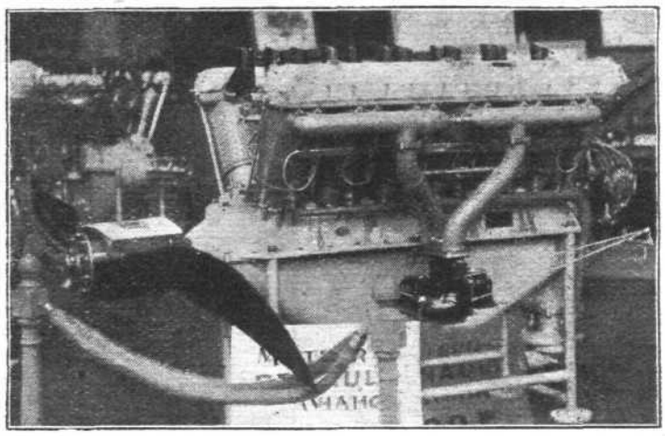
THE POTEZ ENGINE : This air-cooled engine is placed in the machine with its crankshaft vertical

cylinders 160 mm. by 170 mm., and is said to develop 600 h.p. at 1,600 r.p.m. The weight (dry, presumably) is given as about 550 kgs. (1,200 lbs.). The two banks of cylinders are arranged at an angle of 60°, and carburettors as well as exhaust pipes are on the outside of the cylinder-blocks, the intake manifolds passing through the overhead valve casing to the inside of the Vee. The cylinders are of aluminium with steel liners, and the pistons also are of aluminium. The valves, of which there are four per cylinder, are operated from a single camshaft driven by a central gear. Four magnetos furnish the current to two plugs per cylinder.

The second engine is of less orthodox design, and is evidently an attempt to shorten the overall length, each of the four banks having but four cylinders. Whether the arrangement proves a success in practice remains yet to be shown, as the engine has not, so far as we are aware, been installed in any aeroplane. The cylinders are, as already mentioned, arranged in four banks of four each, forming an angle of 90°. Aluminium water-jackets around each bank give the neat appearance of monobloc castings. Overhead valves, four per cylinder, are employed, operated by overhead camshafts. The induction system is unusual, but is said to have given good results. Running along the side of each cylinder-block is a straight manifold, surrounded by a tubular water-jacket which forms the water outlet. At each end of this straight manifold is an adjustable air inlet as well as two petrol jets. The mixing-chamber is thus formed by the manifold itself. The engine, which has a bore and stroke of 130 mm. by 170 mm., is said to develop its rated power of 500 h.p. at a speed of 1,400 r.p.m. The arrangement would certainly appear to possess certain advantages, and it will be interesting to see how the engine comes out of its tests on an actual machine.

Henry Potez

Chiefly designed for, and exhibited in, the Henry Potez Type VIII aeroplane, the Potez engine represents an idea which might be generally applicable to small machines. It is of the four-cylindered vertical type, but is placed in the aeroplane with its crankshaft vertical and its cylinders pointing forward. At the upper end there is a bevel gear, serving at the same time as a reduction gear for the airscrew, transmitting the power from the vertical crankshaft to the horizontal propeller-shaft. The gear reduction is 2 to 1. The four cylinders, which are of aluminium with steel liners, are of the T-head type, with large valves, operated by two camshafts. As the cylinders lie horizontal, the fins are cast parallel to the barrels and not circumferentially. It is stated that reliability has been the first consideration in the design of this engine, and that no attempt has been made to reduce weight to a minimum. For an engine power of 50 h.p.,



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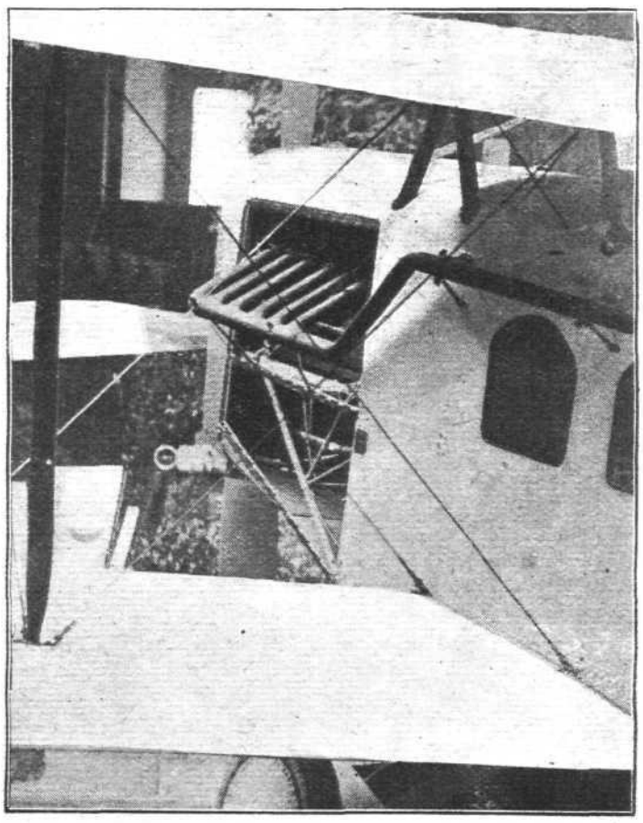
THE 600 H.P. RENAULT ENGINE : Note the clean appearance, compared with earlier models

developed at an engine speed of 2,200 r.p.m., the weight is given as 100 kgs. complete (220 lbs.) or 4·4¾lbs./h.p. The fuel consumption is said to be about 15 litres (3·3 gallons) per hour, or about ·53 lb./h.p. hour.

The Renault Engines

As one of the oldest aero engine firms in France, special interest attaches to the exhibits of Renault engines. As is



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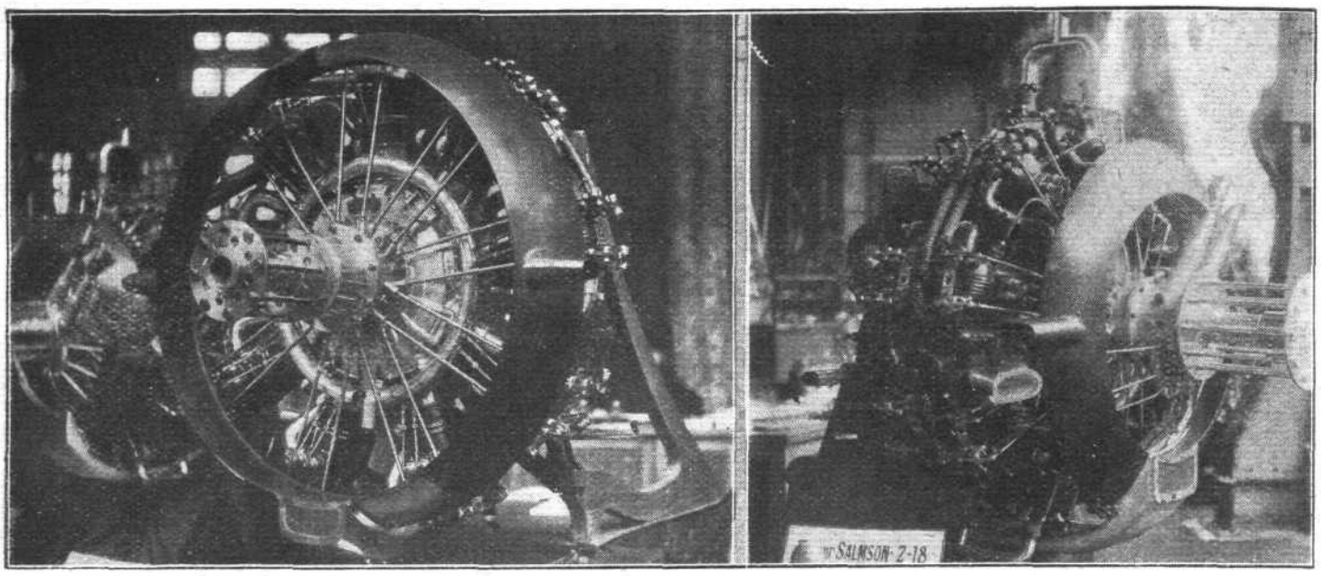
The Rolls-Royce Falcon installed in a Westland limousine



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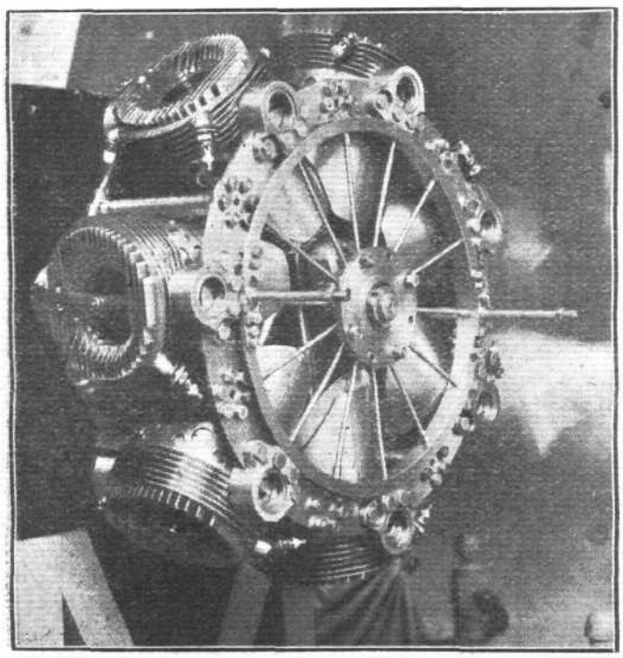
TWO SALMSON ENGINES : On the left the type AZ 9, nine-cylindered engine, and on the right the type Z 18

well known, this firm commenced their career with air-cooled engines of the Vee type, best known of which is, perhaps, the old 70 h.p. engine familiarised in this country by the M. Farman biplanes. As the call for greater and still greater power was raised by War conditions, the Renault firm turned their attention to the production of water-cooled engines, still, however, adhering to the Vee type. The 300 and 450 h.p. engines are already familiar from their extensive use in War machines, and there is, therefore, no need to go into their details here. As regards the new 600 h.p. engine, however, this was only being completed at the cessation of hostilities, and has not, therefore, had the opportunity of proving itself to the same extent as the other models, nor is it so generally known as the earlier types of which it is a development. Generally speaking, the new 600 h.p. Renault follows on the lines of previous types, but a very noticeable "cleaning up" has been effected, as the accompanying photograph will show. The bore and stroke of the 600 h.p. are 150 mm. and 175 mm. respectively, and the normal speed at which this power is developed is 1,600 r.p.m. The 12 cylinders, each in its separate sheet-steel welded water-jacket, are arranged in two banks of six, placed at an angle of 60°. As in previous models overhead valves and overhead camshafts are employed, the camshaft and valve-housing being one of the features that have been subjected to the "cleaning up" process. These covers now totally enclose the valve gear, and the result is a very neat appearance of the top of the cylinder banks. The carburettors—two double Zeniths—are placed on the outside, each supplying two groups of three cylinders. The exhaust valves and pipes are on the inside of the Vee. Ignition is by two SEV 12-cylindered magnetos mounted on the rear end of the engine, and supplying the two plugs in each cylinder. The weight of the 600 h.p. Renault is given as 530 kgs. (1,165 lbs.). The fuel and oil consumption at full throttle are stated to be ·55 and ·055 lb./h.p./hour respectively.



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THE SEJA ENGINE : This engine is of most unusual design, the cylinders being mounted in trunnions, while the connecting-rods are rigidly attached to the pistons

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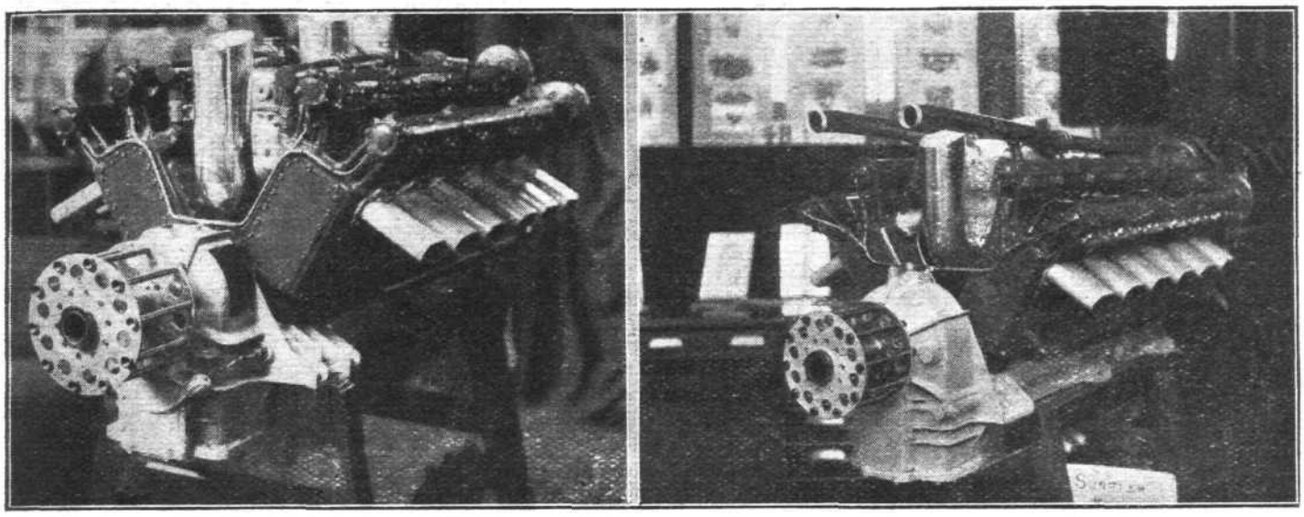
The two-cylindered air-cooled Siddeley 40 h.p. engine, installed in the Bristol Babe



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TWO SUNBEAMS : On the left the Manitou, and on the right the Matabele

Rolls-Royce

This famous British firm was represented at the Paris Show by one engine only, the Falcon in the Westland limousine. The Rolls-Royce engines are, however, so well known that there is no need to enter into detailed descriptions of them here, suffice it to point out that among the successes scored by these engines are the two famous flights of last year · the Transatlantic and the London-Australia.

Salmson (Système Canton-Unné)

Of the engines exhibited by this firm, perhaps the most interesting, from the point of view of novelty, were the large 18-cylindered 500 h.p. engine and the new air-cooled radial. Hitherto the Salmson engines have all been of the water-cooled type, and it therefore came somewhat as a surprise to many to find an air-cooled engine exhibited on this stand. The 300 h.p. engine, Type A Z 9, is also interesting, and for commercial aviation probably likely to be more useful than the 18-cylindered, Type 18 Z.

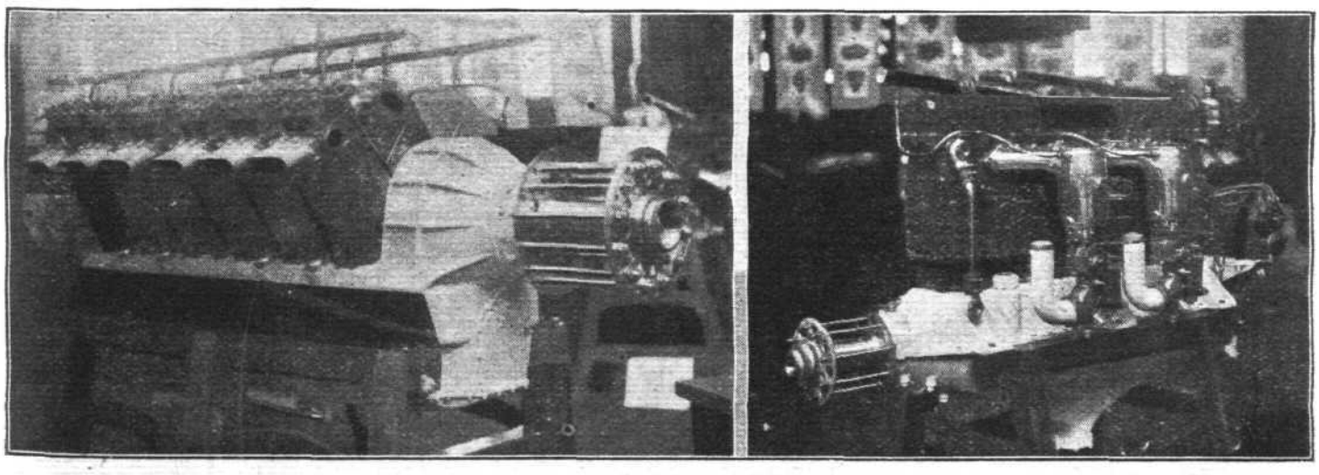
The air-cooled engine, the Type 9 RA, is a nine-cylindered radial like the water-cooled models, and has a strong resemblance to them apart from the feature of cooling. The cylinders are of steel, with aluminium jackets carrying the fins. There are two overhead valves, operated by push rods, in each cylinder, the valve springs being of the wire type. The crankshaft is of the single-throw type, there being one master connecting-rod to which attach the eight auxiliary rods, ball bearings being provided. The bore and stroke of this engine are 125 mm. and 170 mm. respectively, and the rated power of 200 h.p. is developed at 1,500 r.p.m. It is said that for short periods the engine may be revved up to 1,550 r.p.m., when the power is 245 h.p. Evidently there is some mistake here, for one can scarcely credit that another 50 r.p.m. would add 25 per cent. to the power developed. Probably the figure should be 1,850 r.p.m. The fuel and oil consumption at 1,500 r.p.m. is given as ·595 lb. per h.p. per hour. The weight of the engine complete with magnetos and carburettor is 230 kgs. (500 lbs.).

The type A-Z 9 is also a radial 9-cylindered engine, but is provided with water cooling. Generally speaking, it resembles earlier models, but an innovation which will be appreciated for commercial work is that each cylinder is bolted to the outside of the crank-case instead of projecting into it. This greatly facilitates the removal of separate cylinders without disturbing the rest. The nine steel cylinders, with separate sheet steel water jackets welded on, have a bore of 140 mm., while the stroke is 170 mm. The normal engine speed is 1,500 r.p.m., when the power is about 300 h.p. The weight of the engine is given as 300 kgs. (660 lbs.), magnetos and carburettors, but without water and radiator. The fuel and oil consumption are said to total ·56 lb. per h.p. per hour. As regards the durability of the engine, it is claimed that it will run for 1,000 hours without requiring any serious repairs, while the makers state that, normally and without special care, the A-Z 9 will run for 50 hours without stopping. If these claims can be made good, and we have no reason to doubt it, this engine should become very popular for commercial aviation.

Finally, of novel types, the Salmson firm exhibited a 500-h.p. engine with 18 cylinders, which is, practically speaking, two groups of nine placed on a common crank case. Its detail features resemble those of the smaller models.

Ad. Seghers. (Seja).

A rotary engine of very unusual design was exhibited by this firm. The engine, which has been designed by M. Emile Schultz, Assistant Engineer of Bridges and Roads of Paris, has oscillating cylinders, mounted in trunnions on two substantial rings which correspond, in a way, to the periphery of the ordinary crank case. Both cylinders and pistons are cut away at their inner ends in order to make the engine more compact. The pistons, at the inner end of the stroke, are



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THE LARGEST AND THE SMALLEST SUNBEAM : On the left the Sikh, and on the right the Dyak

partially withdrawn from the cylinders, and thus receive air cooling here as well as through the circular ports in the cylinders below the fins. The connecting rods are attached rigidly to the pistons, and it is claimed that in this manner the side thrust is eliminated. The engine, so far as we could ascertain, had not been tested yet, but the advantages claimed for it are light weight (thus a 250 h.p. engine is said to weigh only 1·58 lbs. per h.p., while its overall diameter is only 30¼ inches.

The Siddeley Engines

Two Siddeley engines were shown at the Paris Show, one of which was the "Puma," already well known to our readers. This was fitted in the Bristol Tourer. The other was the little new two-cylinder opposed air-cooled engine, fitted in the Bristol Babe. This engine was described in detail in our issue of December 25, 1919.

The Sunbeams

A very interesting display was made by the Sunbeam Motor Car Co., Ltd., who showed four different types of Sunbeam-Coatalen engines.

The engines, which were described in our issue of December 25, 1919, were the 100 h.p., 6-cylinder "Dyak"; the 300 h.p. "Manitou"; the 420 h.p. "Matabele," and the 800 h.p. "Sikh."

Personals

Married

Maj. ERIC CREWDSON, M.C., late R.E. and R.A.F., younger son of Mr. and Mrs. Francis W. Crewdson, of Gilling Grove, Kendal, was married, on January 20, at Holy Trinity Church, Brompton, to MARY STUART, only child of Maj. Evan W. H. FYERS, and grand-daughter of the late Lieut.-Gen. Sir Wm. A. Fyers, K.C.B.

CECIL RHODES FIELD, late R.A.F., only son of the late Charles Frederick Field and Mrs. Field, of Charlton Place, Charlton, was married, on January 14, at the Chapel Royal, Savoy, to LEILA, only child of Colonel MCCLINTOCK, D.L., and Mrs. McClintock, of Seakinore and Ecclesville, County Tyrone, Ireland.

Squad.-Leader J. B. GRAHAM, M.C., R.A.F., son of the late Mr. Malcolm Graham, Adelaide, Australia, was married on January 24 at St. James's, Piccadilly, to Mrs. LILIAS BODINGTON, widow of Capt. C. H. Bodington, of Holland Park.

CHARLES MCMENAMEN LAING, M.C., A.F.C., R.A.F., late Royal Scots Fusiliers, younger son of Mr. and Mrs. M. Laing, of Terewhiti, Kingston Hill, was married, on January 22, at St. Georges', Hanover Square, to KATHLEEN DORA, younger daughter of Mr. and Mrs. F. G. SAGE, of The Meadows, Claygate, and Stavordale Priory, Som.

RICHARD JOHN MULLINGS, eldest surviving son of the late John Mullings, of Cirencester, was married, on January 20 at Cirencester Parish Church, to MURIEL, widow of Capt. H. Eric DIXON, R.A.F., and younger daughter of Lieut.-Col. F. K. S. Melford, O.B.E., D.L., of Fox Elms, near Gloucester.

To be Married

THE engagement is announced between CAPT. G. RIDEHALGH, R.A.F. (T.), eldest son of Mr. and Mrs. J. Ridehalgh, Oaklands, Barrowford, and DOROTHY A. ROBERTS, youngest daughter of the late Arthur Roberts and Mrs. Roberts, 13, Park View, Harrogate.

The engagement is announced between Maj. D. C. GRANVILLE SHARP, R.F.A. and R.A.F., younger son of Mr. and Mrs. H. R. Sharp, of Southsea, and KATHARINE MARY UTTEN, youngest daughter of the Rev. and Mrs. UTTEN J. EASSON, of Chicheley, Newport Pagnell.

Items

Lieut.-Col. J. T. C. MOORE-BRABAZON, M.P., and Mrs. Moore-Brabazon have moved to 3, Buckingham Gate, S.W. 1, which is now their permanent address.

Mr. EDWARD MANVILLE, M.P., and Mrs. Edward Manville have removed from Keresley House, near Coventry, to 67, Cadogan Square, S.W., which is now their permanent address.

Another London-Spain Flight

FROM information to hand from Spain it appears that Major de Havilland intends to make a flight from London to Madrid and Melilla, and to cover the distance in two days.

The London-Australia Flight

ON his return to England, Capt. G. H. Wilkins, M.C., the pilot of the Blackburn-Kangaroo aeroplane which started in the England to Australia flight, has expressed his great disappointment at the unsuccessful termination of the flight. He said the machine was going splendidly till it was about 80 miles over the Mediterranean, when an oil pipe got smashed, and they could only use one engine. They came back to the aerodrome on one engine, flying over the most difficult country to reach the landing ground. The machine he was flying was of the same type as the one which he will use in the Antarctic, except that the engines of the machine to be used in the South Pole flight are being specially designed to withstand the cold.

Capt. Matthews Down at Bander Abbas

MISFORTUNE continues to dog Capt. Matthews and the Sopwith Wallaby, on which he set out from England to fly to Australia. Word was received in India on February 3, that the machine had crashed 20 miles fron Bander Abbas, at the entrance to the Persian Gulf. Beyond the statements that Capt. Matthews is safe, and that the machine is badly damaged, details are lacking.

Capt. G. C. Matthews was one of the competitors in the air race to Australia won by Sir Ross Smith. He left Hounslow as long ago as October 21, and has met with many mishaps and hindrances. He was held up by the Yugo-Slavs, who thought him a Bolshevist, and was detained a month at Belgrade and a week at Aleppo by bad weather. He was last reported at Baghdad, which he intended to leave on January 25.

Paris to Timbuctoo

ON February 6 Major Vuillemin and Lieut. Dagneau left Algiers on their Breguet machines to continue their flight to Timbuctoo. After flying for five hours, they landed safely at Quangla, between Biskra and In Salah.

An escadrille left Algiers on February 3 in connection with an aerial survey of Algeria and arrived at Biskra after flying for 5 hours 10 minutes. General Nivelle was a passenger in one of the machines, but he has been recalled to Paris.

Lecointe's Latest

DURING a speed trial on his Nieuport at Villacoublay on February 1, Sadi Lecointe succeeded in averaging a speed of 273 km. an hour (170½ m.p.h.), flying over a measured kilom. in opposite directions. His previous record was 266 km. per hour, and he hopes to get the figure up to 290 to 300 km. per hour.

The Rome-Tokyo Flight

THE pioneering machine which left Adalia on January 13 arrived after a very trying flight carried out under adverse weather conditions, at Alep on February 1. A 600 h.p. Caproni biplane, piloted by Lieut. Sala and Borvello arrived at Salonika on February 5.

Air Posts to Finland

IN consequence of the exceptional ice conditions in the Gulf of Finland an air post has been established between Reval, on the south shores of the gulf, and Helsingfors, on its northern shores, reports *The Times* correspondent at Abo. The service is twice weekly.

New York to Cuba by Air

WORD comes from New York that the Cuban authorities propose to spend $15,000,000 in assisting to establish an aerial mail service between New York and Cuba. It is proposed that there should be stops at Atlantic City, Norfolk, Savannah, Jacksonville, Daytona, Palm Beach and Key West, the time allowed for the complete journey being about 28 hours.

FLIGHT
AIRCRAFT ENGINEER

AIRSHIPS

THE PRINCIPLES OF RIGID AIRSHIP CONSTRUCTION

BY A. P. COLE, R.C.N.C., A.M.Inst.N.A.

(*Continued from page 159.*)

THE transverse form of the ship is maintained principally by means of wired transverse frames. These frames are called main transverse frames. The gasbags are then fitted intermediate between these frames, each bag being entirely self-contained. Intermediate frames are fitted between the main transverse frames at equi-distant intervals (Fig. 3). The greatest stresses occur in the main transverse frames when one gasbag is full and the adjacent one empty. The pressure of the gasbag on the transverse wiring in this condition puts a tension on the wires, which in turn causes a compression in the girders of the frame. The amount of the tension in the transverse wiring can only be calculated with any degree of accuracy for the purely radial system, *i.e.*, when the wires radiate from a centre ring and run one to each joint. For this case it can be shown that the tensions in the wires—which are all assumed to be of the same size—are practically equal, and given by the formula—

$$T = C^3\sqrt{A} \cdot R^2$$

where A = area of each wire.
R = length of wire from the centre ring to the joint.
C = a constant depending on the number of sides to the frame and how the centre ring is fixed.

Hence for similar ships or for similar sections of the same ships, to obtain the same stress in the radial wires, the area of the wire should be such that

$$A/R^2 \text{ is constant.}$$

It is seen that the tension varies as the square of the radius, so that in larger ships it tends to become very great. It may be reduced by keeping the centre ring from deflecting outwards, *i.e.*, by fitting an axial wire joining all the radial rings together through the ship. This has been done in R 33 and later classes.

In general, in addition to the purely radial system, chord wires are fitted to assist in breaking up the unsupported areas of gasbag fabric (Fig. 4). The loads in the main transverse frames are then compressive ones due to the components of the tensions in these wires acting through the point of attachment, and to the components of the tensions in the diagonal wires acting through the diagonal wire lugs. Of these, the loads due to components of the radial and chord wires are by far the most important, and the transverse girders are designed primarily to withstand these.

In R 33 and similar ships, with a view to avoiding lateral loads on the main transverse girders due to the reaction of the intermediate longitudinals, a kingpost and trusses were fitted on each girder, so that the lateral load is transferred to the joints of the main longitudinal and main transverse frames.

Spacing of Transverse Frames

The spacing of the transverse frames, both main and intermediate, is a matter requiring considerable judgment. It is obviously desirable from the point of view of weight that the main or wired frames should be as widely spaced as possible, so that the number of gasbags—and therefore their weight—should be reduced, and the weight of the transverse wiring saved. On the other hand with too wide a spacing the longitudinals and keel are not so effectively supported, and the loss of lift and risk of destruction through deflation of any one bag are greater. It is very desirable to concentrate heavy loads, such as cars, ballast, petrol, etc., at the main transverse frames, consequently the spacing of

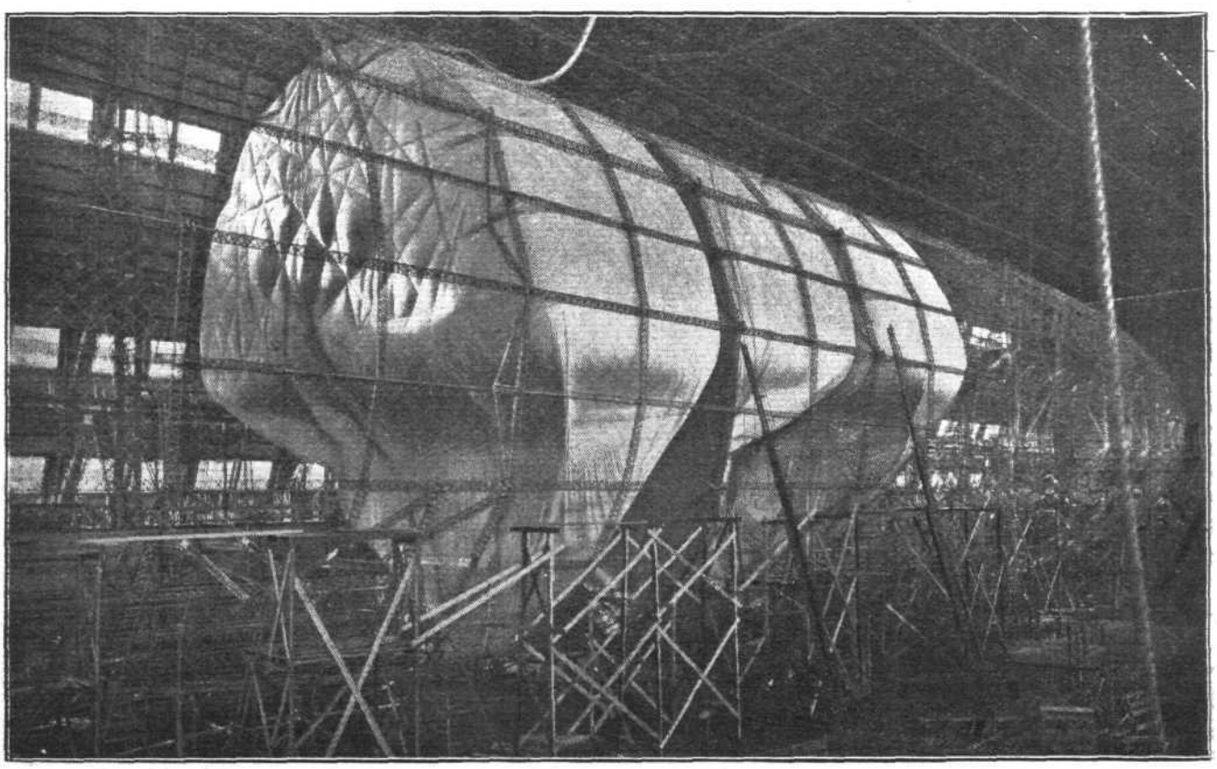

Fig. 3.—R 33, showing longitudinal and transverse framework, diagonal wires, etc.

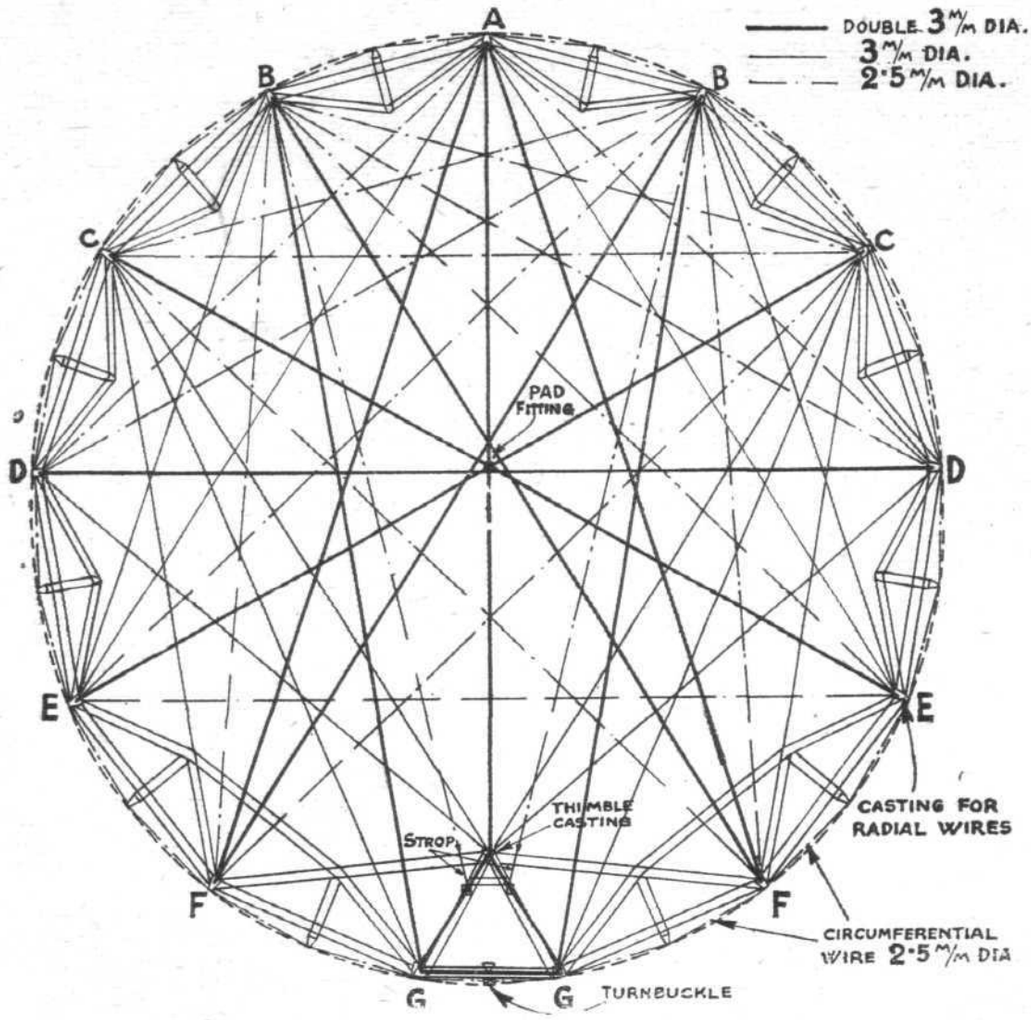

Fig. 4.—Transverse wiring of a main frame

these frames is determined to a certain extent by the position of these items—more especially that of the cars. It is usually desirable to space the frames as far as possible equidistant. In R 33, which is 24 metres in diameter, the main frames are spaced 10 metres apart, with one intermediate frame five metres from the main. In L 70, which is of the same diameter, the main frames are spaced as far as possible, 15 metres apart, with two intermediates five metres apart.

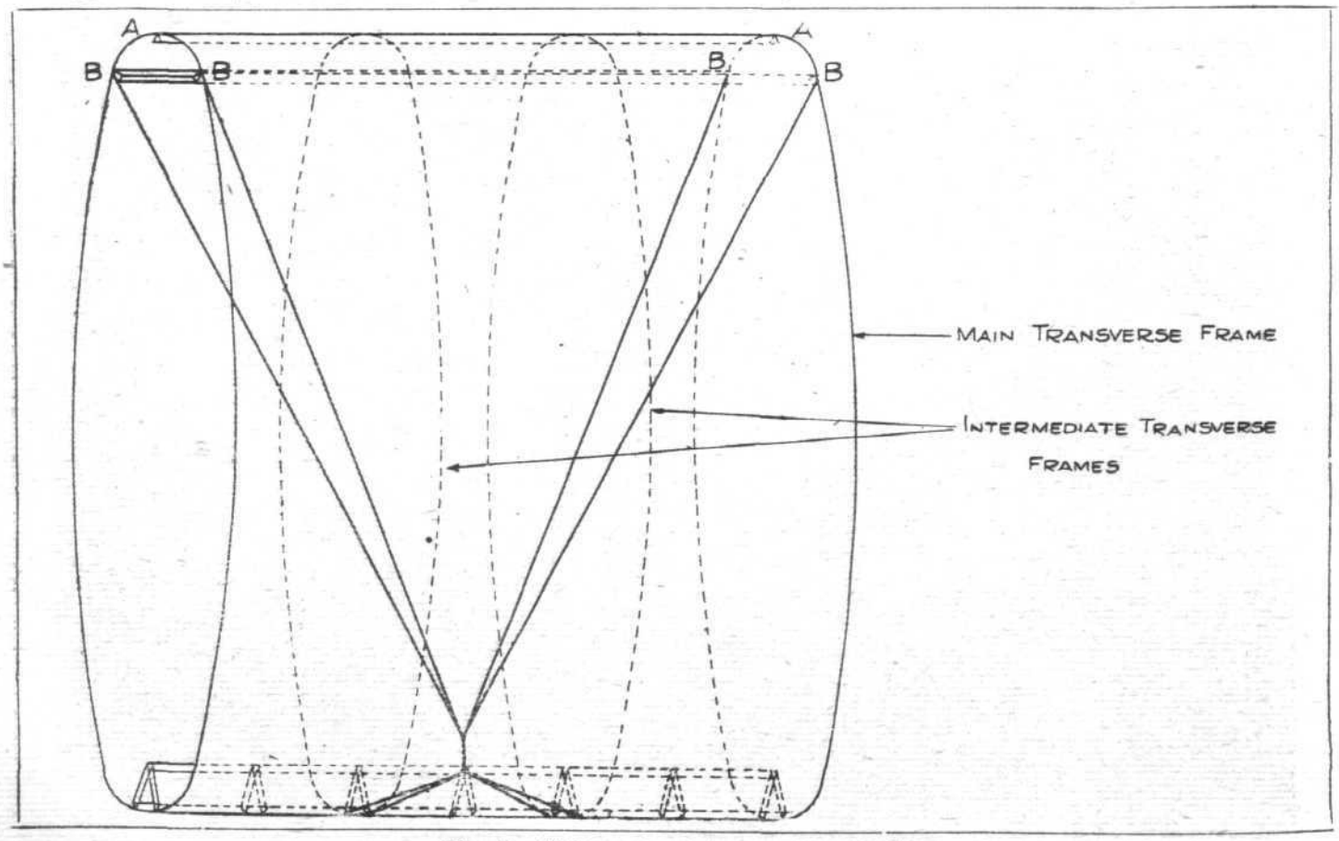

Fig. 5.—Wire support to corridor, L 70

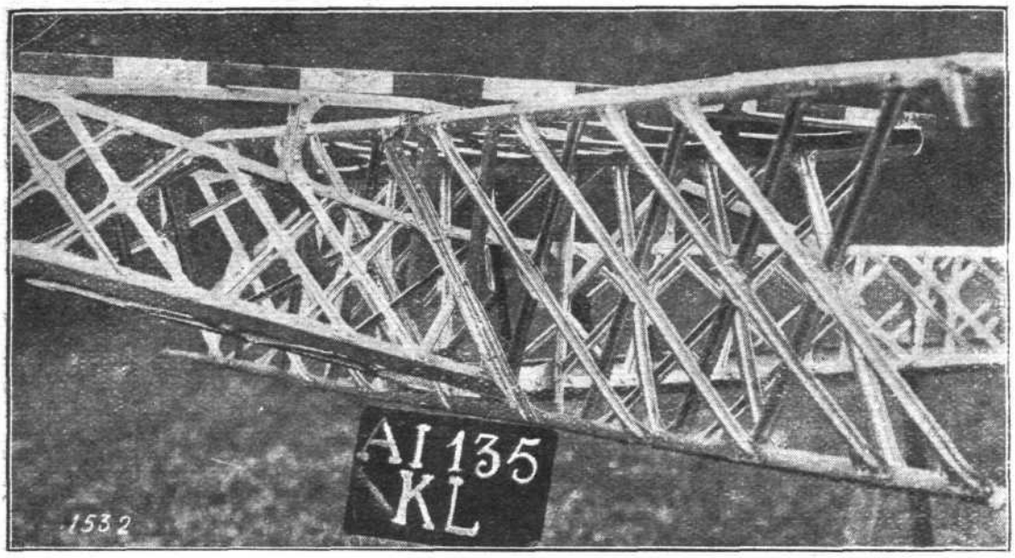

Fig. 6.—Typical joint of main longitudinal and intermediate transverse, Zeppelin type

The latter ship, however, vibrated considerably at high speeds. This was remedied by supporting the corridor at intermediate frames by wires through the gasbag to the top of the ship (Fig. 5).

Keel or Corridor

It was formerly assumed that a keel strong enough to take the whole of the shearing forces and bending moments of the ship was necessary, and the earlier ships were designed on this principle. The longitudinals and diagonal wires were considered solely as maintaining the form of the ship, and not as an integral part of the strength structure. This involved a wasteful distribution of material, and in R 29 the keel as a strength member was entirely abandoned. This ship was designed practically on the principles formulated in the early part of this paper, and has proved to be quite successful in practice.

With the increase in the disposable lift in later ships, it was found impracticable to concentrate the dischargeable weights at main transverse frames, as was done in R 29, and an internal corridor was introduced to carry these loads. An internal corridor is preferred to an external, as although there is a certain loss of gas volume, the effect on the speed,

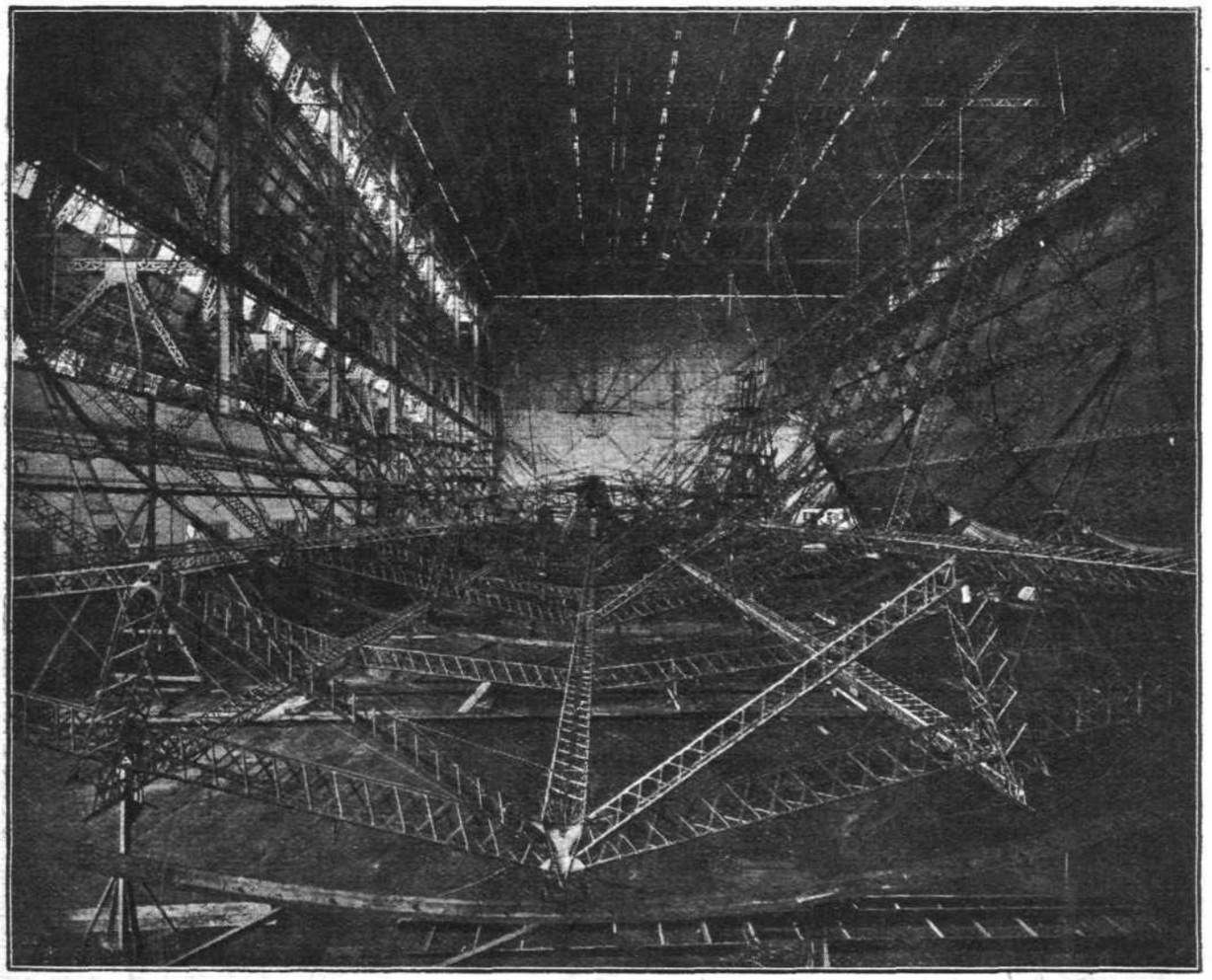

Fig. 7.—General structure of R 34, showing method of forming joints of main transverse girders and of longitudinal girders with transverse girders

stability and controllability in flight is *nil*, and the overall height of the ship is considerably reduced. The strength of the corridor is calculated on the assumption that it is a continuous girder supported at main frames only and loaded to its maximum capacity. For lightness it is clearly desirable that the loads, such as water, ballast, petrol, stores and merchandise, should be concentrated as near as possible to the main frames.

The corridor further provides the means of access between the various cars, and to all other positions in the ship requiring attention during flight. The control wires to the rudders, elevators, gas and water ballast valves and to the engine-room telegraphs are in general led along the corridor and are thereby readily accessible.

Access to the top of the ship is provided by means of access shafts between two adjacent gasbags—except for any special reason only one access shaft is usually fitted.

Design of Girder Work

The design of the girders offers perhaps a wider scope for originality and improvement than the design of any other item in the ship. The requirements in general are :—

1. They should be capable of being easily and accurately constructed.
2. They should allow of simple and light connections to other girders.
3. They should be such that fittings can be easily attached to them, more especially wire lugs.
4. In the case of those girders in contact with the gasbags, they should be free from projections or sharp corners likely to injure the gasbag.

Theoretically the most efficient strut is a tube, which may be either duralumin, wood or steel. Practically, however, the weight of the joint at the junction of transverse and longitudinal girders with tubular construction is such that together with the weight of girders, the total weight of hull is greater than that when the girders are built up and triangular in shape. In ships of the present type, *i.e.*, up to about 3,000,000 cub. ft. gas capacity, the greatest efficiency of construction is obtained by using either duralumin or wood built-up girders. For very large ships, however, it is probable that the loads in the girders will be such that steel can be used in such thicknesses as to make a steel ship a practical proposition.

Duralumin triangular girders are made up of three channels forming the corners, joined by bracing pieces. The strength of this type of girder in compression can be found from the formula—

$$(ey/k^2)\ \sec\ (\pi/2\ .\ l/l_0) = (f - p)/p$$

where l = length of strut.

p = failing stress measured by $\frac{\text{crippling load}}{\text{area of continuous members}}$

f = failing stress in compression of a length of channel equal to the span of the bracing piece.

y = distance of channel which fails from the neutral axis of girder.

k = least radius of gyration about the neutral axis.

$l_0 = \pi k \sqrt{(E/p)}$ where E = modulus of elasticity for the material.

= 4,700 tons/in.^{2} for duralumin.

e = equivalent eccentricity of loading.

The value of e must be deduced from experimental results. For triangular struts, as used in R 33, its value may be taken as

·05 × least radius of gyration.

The dimensions of the girders generally used are such that l/k approximately = 50.

If the girders are used entirely in compression they are equilateral, if they have to bear in addition lateral load they are isosceles with the greatest depth in the plane of the lateral load.

Wooden girders have been used in some types of ships, notably in R 31 and R 32, and in the German Schutte-Lanz ships. In the Schutte-Lanz ships the girders are built up of three-ply aspen wood stuck together with cold casein glue. In R 31 the corner pieces were made of spruce, fashioned to form a closed cell, and the sides of three-ply aspen, lightened as necessary, the whole being stuck with cold glue. Wooden girders have to be varnished for protection against moisture. It is essential that all girders should be rigidly joined together. This rigidity is secured in duralumin built-up girders by butt strapping the respective channels each to each, and carrying the bracing pieces as far as possible through from one girder to another (Fig. 6). When the girders meet at an angle, such as the girders making up the transverse frame, bent pieces of duralumin plate join the corresponding faces of the girders (Fig. 7).

It is also essential that the continuity of strength should be everywhere preserved.

(To be continued.)

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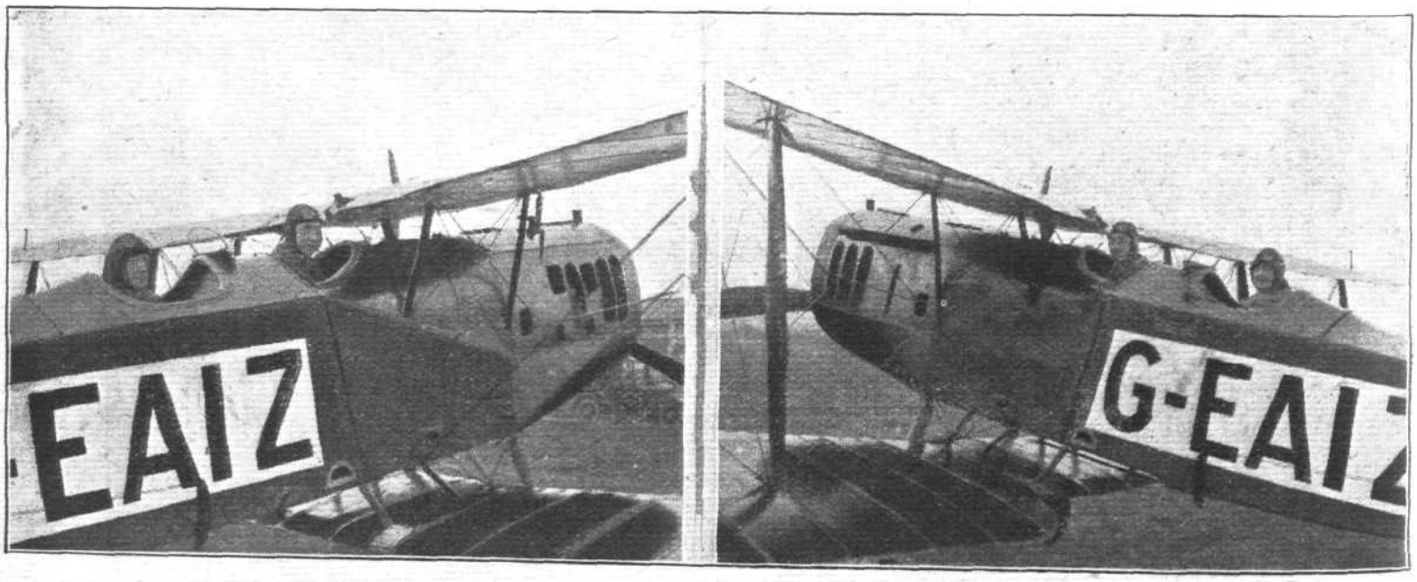
U.S. Mail Services

BEFORE the Post Office Appropriation Bill was passed by the U.S. House of Representatives on January 15, the item of $850,000 for continuing the existing aerial mail service beyond July 1 next was struck out. It was ruled that the Post Office Department had no authority to establish the aerial mail as a permanent service. Efforts will be made to rectify the matter in the Senate, but if they are not successful, the New York-Washington and New York-Chicago services will come to an end.

A Rigid for the U.S. Navy

PREPARATIONS are now going forward in connection with the rigid dirigible which is to be constructed at the Naval Aircraft Factory, Philadelphia. A special drawing office staff has been engaged to prepare the large number of drawings which will be required.

◈ ◈



CHILE AND AVIATION : Some months ago the Chilian aviator Capt. Armando Cortinez made a very fine flight in a Bristol monoplane, being the first pilot to make the double flight over the Andes from Chile to Argentina and back. Capt. Cortinez is at present in this country studying British aviation and aeroplanes. On a recent occasion he was taken up by Mr. F. Uwins, the Bristol test pilot, in a Bristol " Tourer," and very much enjoyed his flight. His compatriot Senor Claude, one of the leading coal magnates of Chile, also was taken for a flight, and the opinion of both is that Chile must make extensive use of aircraft

FLIGHT

ROYAL AERONAUTICAL SOCIETY NOTICES

HIS ROYAL HIGHNESS PRINCE ALBERT has graciously signified his intention to take the chair on the occasion of Mr. J. L. Cope's lecture before the Society on his proposed flight to the South Pole. Details as to place and date will be announced later.

The next meeting will take place at the Royal Society of Arts, 18, John Street, Adelphi, on Wednesday evening, February 18, when Major Percy Bishop, Associate Fellow, will read a paper on "Aircraft Design in Relation to Standardisation." The chair will be taken by Mr. H. White-Smith at 8 p.m.

The lecture by Lord Montagu of Beaulieu on "A Comparison of the Cost of Air Ton-miles with other Forms of Transport" is postponed until Wednesday, May 12. Maj.-Gen. Sir Sefton Brancker will deliver a paper on Wednesday evening, April 14, on a subject to be announced later.

The "Wilbur Wright" lecture on Wednesday, June 9, will be delivered by Commander J. C. Hunsaker, U.S.N.

The Chairman of the Society, Air-Commodore Bagnall Wild, C.M.G., C.B.E., is delivering a lecture on "Safety in Flight" before the Scottish members of the Society on February 11, at Glasgow. He will repeat his lecture at Edinburgh on February 12, and at Dundee on February 13.

The attention of students is called to the fact that on attaining the age of 26 they cease to be eligible for membership in that grade. Such students should apply for election as members, or associate fellows if their technical qualifications warrant this.

Members, and especially students, are reminded that the library at 7, Albemarle Street, is now open on Saturdays from 2 to 5 p.m.

Members are reminded that subscriptions for the Royal Air Force Memorial Fund should be sent to the Secretary of the Royal Aeronautical Society on or before February 29 next.

Mr. R. H. Mayo has been elected a Fellow of the Society.

W. LOCKWOOD MARSH,
Secretary.

THE INSTITUTE OF AERONAUTICAL ENGINEERS

THE report that has been circulated stating that Mr. R. L. Howard-Flanders has been appointed a Vice-President, is erroneous, Mr. Howard-Flanders having been appointed Chairman. No Vice-Presidents have been appointed. Mr. H. P. Folland has been appointed Deputy-Chairman.

Copies of a *résumé* of Prof. Bryan's Presidential Address will be circulated among members pending the publication of a verbatim report of the proceedings.

Dr. Stefan Laurysiewicz, the Polish Delegate at the Peace Conference in Paris, has been elected an Honorary Member. Mr. G. Tilghman Richards has been elected a Member. Mr. L. G. Caunter has been elected an Associate Member.

The following have been elected Associates and have been nominated to sit for the first Intermediate Examination in order to qualify for Associate Membership :—Mr. A. T. Cross, Mr. G. E. Petty, Capt. Newenham Travers, Mr. E. L. Widdicombe, Mr. C. G. Miller.

A programme of lectures is being drawn up by the Council, and the date of the first lecture will be announced shortly.

THE CAMBRIDGE UNIVERSITY AERONAUTICAL SOCIETY

As a result of a meeting called by Squadron-Leader J. Sowrey, A.F.C., and held on January 21, 1920, in the Engineering Laboratories, a Cambridge University Aeronautical Society was formed with the object of promoting interest in and knowledge of aeronautical science in the University by: (*a*) Lectures and demonstrations; (*b*) Visits to works and places of practical interest. Membership is open to all members of the University and of Newnham and Girton Colleges.

Professor B. M. Jones was unanimously elected President, and the following committee was elected for the present term :—Chairman, Mr. H. A. Mettam, A.F.R.Ae.S. (Trinity); Secretary, Mr. O. E. Simmonds (Magdalene); Members, Miss L. Chitty, A.F.R.Ae.S. (Newnham); Squadron-Leader J. Sowrey, A.F.C. (Queen's); Flight-Lieut. H. M. Fraser (Emmanuel).

A meeting of the society was held in the Botany School on February 4, Sir Horace Darwin, K.B.E., F.R.S., presiding, when the inaugural lecture was given by Mr. H. Hamshaw Thomas, M.B.E., M.A., F.G.S., Fellow of Downing College and late Captain, R.A.F., on "The Use of Aircraft in Exploration and Survey," a large number of members and visitors being present.

Mr. Mettam first outlined the aims of the Society and the programme which had been arranged for the present term.

Sir Horace Darwin likened the society to a young vigorous plant, whose growth he did not doubt and whose prosperity he sincerely wished. He emphasised the importance of aerial photography for survey.

Mr. Hamshaw Thomas said that although the possibilities of aerial photography as a means of exploration and survey had been both exaggerated and minimised, we had now left behind the days of the hapless André who tried in his spherical balloon to drift across the pole, and had arrived at a stage of great reliability both in aircraft engines and construction. He then dealt in turn with the various types of survey where aerial photography would be particularly useful, and pointed to some cases where it alone was practicable. He said the Geographical Society were very anxious as soon as possible to undertake an aerial survey of the Himalayas, and for this purpose a machine would have to climb 29,000 ft. and have a large petrol capacity on account of the dearth of landing grounds.

There existed also a great field for aerial survey on the Indian frontier, and Mr. Thomas cited the State of Nepaul, of which there existed no accurate survey at all. He then showed the similarities and differences between a photographic mosaic and a map, and outlined the various difficulties that had to be contended with. He emphaised the necessity of flying straight and level, and showed how a photograph taken whilst climbing or diving really depicted an area of rhomboidal shape. Special cases where aerial photography was useful were in barren or hilly country, very detailed country and difficultly divided country. The advantages of regularly photographing rivers which were in the habit of changing their courses were also emphasised. Mr. Thomas showed an aerial survey of Damascus which took two days to complete, whereas the surveying of Cairo by usual methods occupied five years. Aerial photography had also uses in archæological research and in coastal survey, the various tones indicating different depths.

The lecturer said there was still much to be done to perfect aerial photography, but when six machines working on an average three days a week had surveyed 2,000 square miles in a year, he felt there was no doubt of its commercial and utilitarian value as a means of surveying.

The lecture was illustrated by lantern slides of Palestine and the East, one taken vertically above the crater of Vesuvius being particularly fine.

Summer Time in France and Algeria

THE Air Ministry announces that the following Notice to Airmen (No. 13) has been issued :—

"It is notified for information that Notice to Airmen No. 7 respecting the introduction of Summer Time in France and Algeria is cancelled, as the matter is being re-considered by the French Government. Meanwhile ordinary time is in force."

London-Paris Air Mail

WITH their flights on Saturday, the Airco aerial postmen completed their twenty-fourth week of daily flying between London and Paris. Since the inception of the London-Paris "air express" on August 25 last, the Airco pilots have flown for 670 hours between the two cities, at an average speed of 100 miles an hour, their mileage to date totalling 67,000—or more than 13 times the length of the new African "airway" between Cairo and Cape Town.

H.P. Paris and Brussels Air Services

ON the Handley Page Continental Air Services between September 2, 1919, and February 5, 1920, 933 passengers and 43,551 lbs. of freight have been carried over a distance of 66,293 miles.

THE FLIGHT TO THE CAPE

IN our last issue we were able to briefly record the arrival of *The Times* Vickers-Vimy-Rolls aeroplane in Cairo. Since then three other machines have set out from England, with Cape Town as their objective, so while there is no actual competition, there is a very interesting informal sporting contest. Of the three new aspirants for the honour of being the first to fly from Cairo to the Cape, one—the Silver Queen—is another Vickers-Vimy-Rolls, with a South African crew on board; the second is a Handley Page-Rolls, and the third a de H.14-Napier. The progress of these various machines is as follows:—

"The Times" Aeroplane

The Vickers-Vimy-Rolls landed at Heliopolis at 2.20 p.m. on February 4, having left Sollum 4 hrs. 35 min. previously. Among the first to greet Capt. Cockerell and Capt. Broome were Air-Commodore Groves, commanding the R.A.F. in the Middle East; Col. Drew, his Chief of Staff; Maj. Lloyd, Commandant of the aerodrome; Lieut.-Col. Conrad, commanding the Egypt Brigade, R.A.F.; Mr. Pooley, representing Messrs. Vickers, Limited; and Dr. Chalmers Mitchell, who had made the journey from England, overland. The machine was then carefully overhauled, but everything was completed by the evening of the next day, and at 9.45 a.m. on February 6 the machine, with the two pilots, Dr. Chalmers Mitchell, and the two mechanics, left Heliopolis—where the first aviation meeting in Egypt was inaugurated ten years previously—for the South.

The machine passed high over Assuit at 12.15, flew over Luxor at 2.10, and, a few minutes later, had to land owing to a leaky water jacket, on the edge of the desert. Later it flew over Assuan and landed on the aerodrome. It was then too late to start repairs, and the crew decided to bivouac under the machine, so as to be ready to start first thing in the morning. They were able to get away at 7.15 a.m., and steered south, crossing the desert sand and hills. A forced landing at Station Six was necessitated by a second leaking water jacket, while trouble with a third jacket entailed another forced descent. After much walking a native was found, and he eventually obtained water. Khartoum was reached at dusk. It was then decided to spend a day repairing the water jackets which were giving trouble.

The "Silver Queen"

The second Vickers-Vimy-Rolls, which has been purchased by the South African Government, left Brooklands on February 4 at 7.30 a.m. It was piloted by Lieut.-Col. Van Ryneveld, D.S.O., M.C., and Flight-Lieut. Brand, D.S.O., M.C., D.F.C., two South African flying officers who distinguished themselves during the War. It was hoped to make Turin the same day, and this was accomplished after a halt of 15 minutes in France. The next day it flew on to Rome, landing at Centocelle aerodrome. On February 6 Taranto was reached and left again at 9.30 p.m., the pilots deciding to cross the Mediterranean by night. Sollum, on the north coast of Egypt, was reached at 11.30 a.m. the next day, the time taken indicating the very severe weather encountered by the pilots.

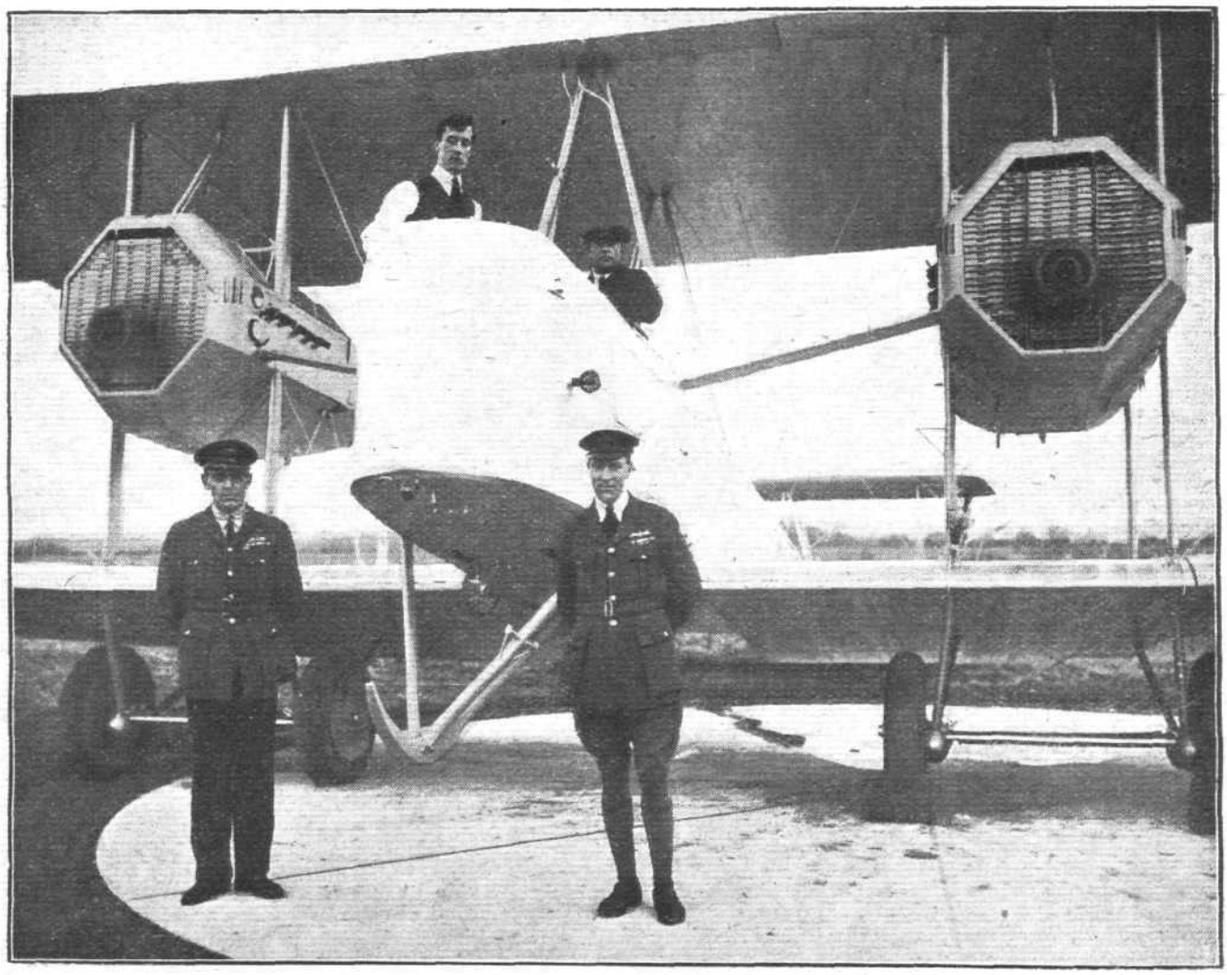
The machine arrived at Heliopolis at 8.25 on February 9 having taken five hours and ten minutes to accomplish the journey from Sollum.

The Airco-Napier

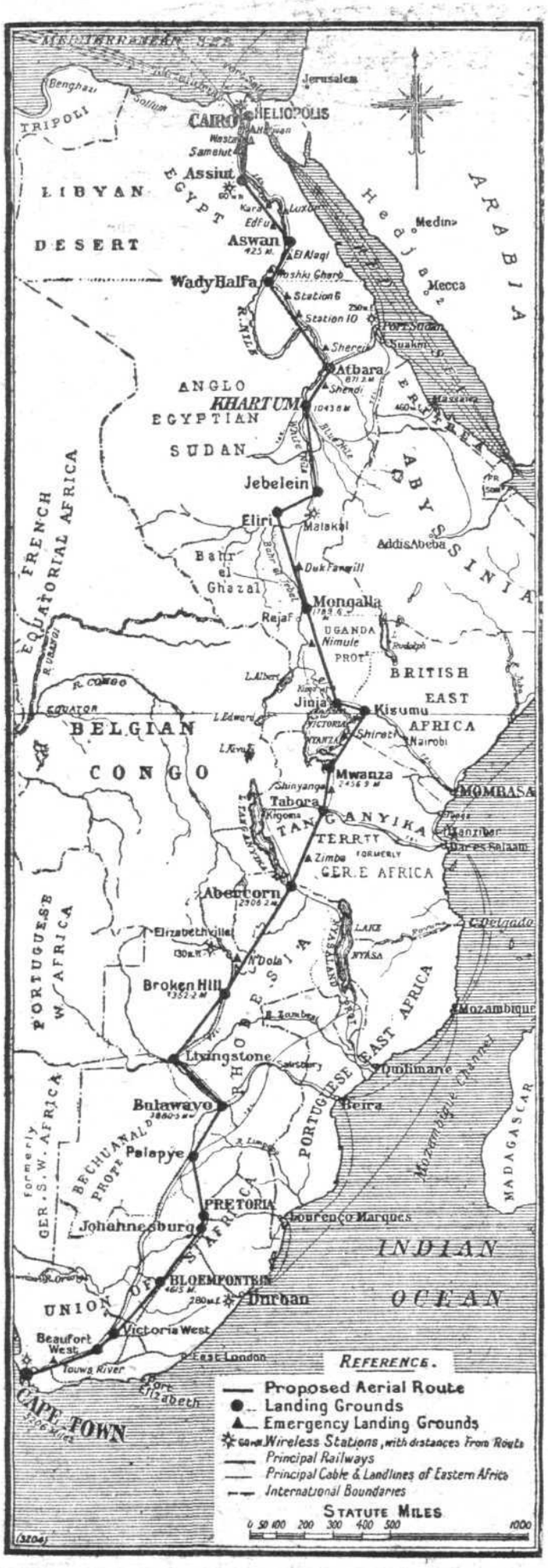
The de H.14 or Airco-Napier machine left Hendon on February 4 and landed at Lympne. It left there the next morning at 10.30, and reported at Le Bourget at 4.45 p.m. on February 7. This machine is fitted with a 450 h.p. Napier. The pilot and navigator is Flight-Lieut. Cotton, R.A.F., with whom is a second pilot, who will act as engineer, Lieut. W. A. Townsend, R.A.F.

The Handley Page

The fourth machine is a Handley Page-Rolls, which was reported to have flown from Rome to Brindisi on February 6.



LONDON-CAIRO-CAPE TOWN AIR-WAY: Lieut.-Col. P. Van Ryneveld, D.S.O., M.C., and Capt. C. J. Q. Brand, D.S.O., M.C., D.F.C., the Pilots and "the Crew" of the Vickers-Vimy-Rolls aeroplane "Silver Queen," on which they started from Brooklands last week to fly to Cape Town in connection with the Union of South Africa Government flight. The "Silver Queen," partly seen in the photo., is a replica of Capt. Sir Ross Smith's machine, on which he successfully accomplished the London-Australia flight



CAIRO-CAPE TOWN AIR-WAY: Map of the route, reproduced by courtesy of *The Times*, which, in conjunction with the "Contour" of the route published last week, enables the journeying of the various pilots and machines now on the way to the Cape, to be intelligently followed day by day.

The machine is piloted by Maj. H. G. Brackley, D.S.O., D.S.C., and Lieut. Symms.

The following messages have been received by *The Times* in connection with the flight:—

From the Prince of Wales:

"The Prince of Wales wishes every success to Dr. Chalmers Mitchell and crew of the aeroplane on the journey across the African Continent."

From Queen Alexandra:

"I have followed with the greatest interest the arrangements which have been initiated by *The Times* for a flight from Cairo to Cape Town, and am glad to know that the aeroplane has arrived at the first stage of its journey.

"I fully appreciate the utility of this project, and wish Dr. Chalmers Mitchell and those with him a safe journey, with my earnest hope that the objects of this great endeavour, which are of national importance, will be successfully achieved."

From Lord Milner:

"I congratulate you on the safe arrival here of the Vickers-Vimy aeroplane in its epoch-making flight. This fresh example of British enterprise will forge a new link in the chain of Empire and draw yet closer to Great Britain the bonds with South Africa and the intervening territories.

"My heartiest good wishes for the complete success of this trial flight and for the future developments of this invaluable line of communications."

From Maj.-Gen. Sir F. H. Sykes, Controller-General of Civil Aviation:

"As a further step in the development of aviation, and as once again demonstrating its confidence in the essential value of flight, I most cordially congratulate *The Times* on its enterprise in being the first to attempt the great flight from Cairo to the Cape.

"At the present stage of civil aviation such pioneer efforts are of incalculable value. May success attend the men who are engaged upon this great Imperial event, and those who are co-operating all along the route.

"May the result be a further triumph for British initiative and effort, and so forge yet another link in the chain which binds the British Empire."

From Lord Allenby, High Commissioner for Egypt and the Sudan:

"KASSALA (EASTERN SUDAN).—Learning that a member of *The Times* staff is about to start out on a flight from Cairo to the Cape as passenger in the Vickers-Vimy machine, I wish to congratulate *The Times* on their initiative.

"I am glad that an Englishman, in a British machine, is to be the first passenger by air on a line which will undoubtedly become one of great commercial utility and Imperial importance."

Mr. Asquith:

"Best wishes for the safety and success of the flight from Cairo to the Cape which you have promoted, and congratulations on your enterprise in these important experiments."

Lord Chelmsford, Viceroy of India:

"DELHI.—I have heard of your enterprise with interest and I look forward to the development of Imperial communications by means of aviation.

"I have full confidence that before long the development of aviation will bring India into closer touch with the United Kingdom and other parts of the Empire."

Mr. W. M. Hughes, Prime Minister of Australia:

"MELBOURNE.—I offer you my warmest congratulations upon your effort to establish an aerial link between Great Britain and South Africa, which I trust will be crowned with complete success.

"Your splendid enterprise, following upon the recent epoch-making flight to Australia, strikingly illustrates the development and possibilities of aviation, and will serve still further to emphasise the value of the Imperial connection, in the light of the closer relations and speedier communication which have become possible between the component parts of our great Empire of Commonwealths."

Air Plans for Pacific Coast

MAJOR MACLAREN, a member of the Canadian Air Board, who has been investigating the conditions affecting the promotion of aviation on the Pacific Coast, has recommended to the Air Board that air stations should be established at several points on the coast and in the interior, states *The Times* correspondent at Vancouver.

He advocates the use of the aeroplane for patrolling the fishing grounds and forests and for exploration, and urges that there should be a complete chain of wireless ground stations.

AIRISMS FROM THE FOUR WINDS

IT is well that the list of German customs-of-war violators includes some of the air pirates who directed their attacks upon non-military centres and districts. The "accused" might well have been extended. Those at present called upon to answer indictments for attacks on undefended British towns by airships and aeroplanes are :—

Linnarz, commander of the airship which bombarded the London district on May 31, 1916.

Böker, commander of the airship which bombarded Hull on March 5, 1916, and Edinburgh on April 3, 1916.

In addition to the above, all persons, crews included, who were concerned in or responsible for the aeroplane attacks on Kent, Essex, and London on December 5 and 6, 1917, and on the London district on May 19 and 20, 1918.

THE full list forms a volume of 194 pages, and is divided into seven parts :—

1. The British list, demanding 100 individuals, some of whom are not mentioned by name.
2. The French list of 234 names.
3. The Italian list, consisting of 29 names.
4. The Belgian list of 334 names, 265 not being mentioned by name.
5. The Polish list of 53 names.
6. The Rumanian list of 41 names.
7. The Yugo-Slav list of four names.

WHAT'S the matter with the Sovereign anyway, that it cannot "look the dollar straight in the eye" at the present moment? It's the *paper* "Bradbury" and the fictitious *paper* credit which cannot face the gold-backed dollar. Get down to facts and increased production, and Mr. Bradbury will vanish into the *ewigkeit* before the advance of the key to the golden age—the golden sovereign.

THE Air Ministry announces that notice to airmen No. 7 respecting the introduction of summer time in France and Algeria is cancelled, as the matter is being reconsidered by the French Government. Meanwhile ordinary time is in force.

Hope this is an indication of no "summer time" here this year or hereafter.

IN aid of the new-formed Officers' Association, established under the presidency of Earl Beatty, Earl Haig and Sir Hugh M. Trenchard, the largest grant, £100,000, the association has yet received, has been voted by the Committee of the National Relief Fund.

UNDER a new Army Order "Royal Tournament" is to replace the hitherto rather over-long title of Royal Naval, Military and Air Force Tournament. This year is the 37th of the event, and the date for holding it at Olympia is May 20 to June 5 inclusive. The following two days, June 7 and 8, will be devoted to championship competitions under the ægis of the Imperial Services Boxing Association.

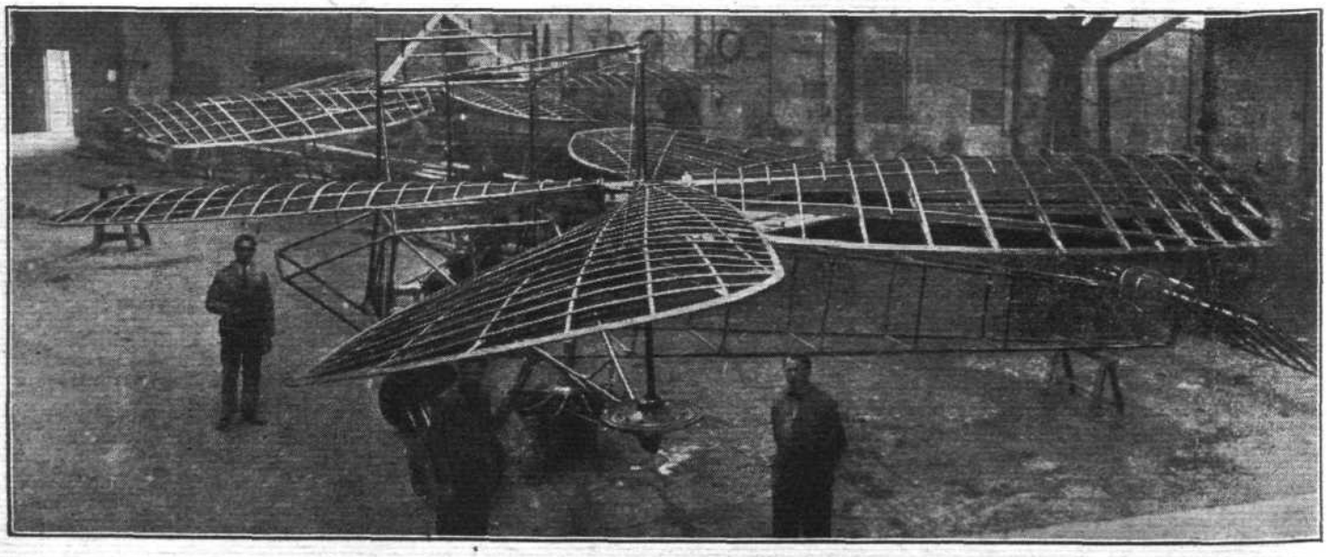
ANY little delays from minor troubles in the Cairo-Cape scientific "exploration" flight being carried out under the auspices of *The Times*, will not militate against the epoch-making character of the undertaking. The side-issues for good which will arise and are arising will more than justify the more or less leisurely covering of the route. Medical aid organisation for remote parts looks like forming no small part in the beneficial results, whilst bringing into prominence the possibilities of the opening out of the latent commercial riches known to be awaiting development, should go far to further help the British Empire to quickly re-establish itself as pre-eminent in the world's affairs. From the pen of Major E. S. Grogan, D.S.O., in *The Times* some fascinating prospects are foreshadowed. And he is qualified to speak as a past African explorer. Transport appears to be the crux of the situation. Major Grogan points out that, economically speaking, Africa is a huge, trackless waste, sprinkled with relatively small but absolutely large areas of immediate economic value. Areas such as the cotton lands of Uganda and the coffee, sisal, maize, and flax lands of British East Africa could produce enormous supplies if transport were available.

Many of these areas have large populations of primitive natives, who require only the stimulus and organising capacity of the European to become important contributors to the world stock of essential foods and raw materials and reciprocally important consumers of the manufactures of Great Britain.

IN Africa, the European is not merely the individual producer as he is in Canada or Australia ; he is the yeast that leavens the inert dough of Africa's people ; he is that mysterious factor (undiscovered by Marx) which raises to infinity the *per capita* effect of the individual effort. Rapidity of movement and intercommunication between these European stimuli is the first essential of African progress. The light car, wireless telegraphy, and the 'plane are facile means whereby the physical obstructions to communications can be overcome ; and their advent heralds a new era, for all Africa.

Any factor that will relieve the intolerable toil of movement across Africa increases proportionally the efficiency of each European in his function of stimulant. The dry season and the wet season has each its special obstruction to movement. The aeroplane floats to its destination in ethereal contempt alike of mud and desiccated waterholes.

It is the great time-saver, and may help materially to retrieve the waste of the last decade, that vital period during which the previously proved resources of Africa might have been rendered available to the world by a bold policy of road and railway construction.



THE HELICOPTER UP TO DATE: The French "Alerion," a twin-screw direct-lift machine, the patents for which have been purchased by the French Government. The two screws are built as ordinary wings, and will have external bracing

Africa, by virtue of her immeasurable undeveloped land areas, holds the key to the solution of Europe's troubles. Limitless land, reliable rain and hordes of primary producers, once integrated in relation to world commerce by a comprehensive transport system, offer the compensating factor which can speedily redress the balance between the congested industrial populations of Europe and an inadequate world-supply of food and raw material.

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IN conclusion, Major Grogan says :—

" All of us who appreciate the vital significance of Africa to an economically distorted world, welcome this aerial venture because it serves to focus attention on the stupendous dimensions of this untapped source of relief to a starving world.

" I sincerely trust that this venture will be maintained far beyond the achievement of its first dramatic phase, and that regular trips will be arranged and passenger accommodation provided for the elders of the Colonial Office and the juniors of the most promising ingredient in Parliament—the Labour Party."

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BY way of example of the indispensability of the use of planes for a job of the nature of a Pole Expedition, Sir Ernest Shackleton makes the following very illuminating illustration:

First, a light seaplane of small wing spread would be of great value to a ship navigating through the pack ice. The horizon limit from the masthead of an ordinary exploring ship is about 12 miles ; therefore, when working for open " leads," it often happens that one pushes through, at great expense of coal and time, a line of heavy ice towards a black line that indicates open water, only to find that this open water is of limited extent ; and perhaps away to the right or left comes into view a much large expanse for free navigation.

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If on a calm day a seaplane were put over, within an hour a report could be brought back to the ship as to the condition of the ice and the lanes of water within a radius of 50 to 70 miles, which is all that is necessary or that could be useful, for by the time the ship had obtained its objective the ice and " leads " might have changed in character and position, and so it would be necessary to make another ascent.

The above is what Sir Ernest considers the prime use of the aeroplane in navigating the pack. It is necessary for the seaplane to rise from the water and return to the water ; the pack, being as a rule hummocky, would be most dangerous to come down on, and as, owing to the peculiar condition of light, there is often a lack of shadow, a safe landing on the pack would be most problematical.

Secondly, in regard to extended land flights, there is but one known land area in the Antarctic where an aeroplane can be at all sure of making a safe landing, and that is on the surface of the Great Ice Barrier ; but even there the greatest skill would be required, for the apparently smooth surface, viewed from above, resolves itself on closer inspection into a series of wind furrows resembling on a gigantic scale a ploughed field, though there are spaces where the surface is absolutely smooth.

He considers it possible by a series of short trips to lay a line of depôts for 300 miles inland from the Barrier edge ; but to accomplish this the greatest care must be exercised, especially as regards the weather, and the greater part of a summer's season would be occupied in carrying out this programme. To attempt a flight to the Pole without a line of depôts to fall back on (in the event of anything happening to the aeroplane necessitating a forced landing) would be, in his opinion, impracticable and suicidal.

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After reminding one that the distance to the Pole from the most favourable place for taking off is 730 miles, Sir Ernest claims that this can be negotiated subject to expert opinion answering in the affirmative the following queries :—

Is there in existence an aeroplane capable of making a sustained flight for a distance of 1,460 geographical miles under the following conditions ?

(*a*) 900 miles of the flight being at an altitude of some 10,000 ft., where the temperature dips to 40 below zero in the height of summer.

(*b*) Where sudden blizzards may be encountered travelling at the rate of 100 m.p.h. —with snow as fine as flour—and when during such a blizzard it is impossible for a man to see more than a yard.

(*c*) If the aeroplane after landing can rise again on a surface likely to be either soft snow 3 ft. in depth, or deeply corrugated by wind furrows.

- - -

Without these conditions can be complied with Sir Ernest thinks a flight to the Pole without a line of depôts spells almost certain disaster, and in support of his views he gives one illustration as follows :—

Assume the aeroplane reaches the Pole and has to come down, and through some mechanical trouble or sudden blizzard is broken and useless, it is a physical impossibility for the party to pull their sledges a distance of 730 miles back to the base without supporting depôts *en route*. The weight of equipment and food necessary for such a journey is at least 1,000 lb., which is more than the tractive power a party of four men can handle.

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It is a healthy sign that a " Cambridge University Aeronautical Society " has been formed amongst the undergrads. Their first meeting on January 21 spelt " Success " throughout, and the objects of the Society, viz. to promote interest in, and knowledge of, aeronautical science in the University, look like bringing in a big membership. All members of the University and of Newnham and Girton Colleges are eligible.

A résumé of the first meeting appears elsewhere in this issue, and thanks are due to a well-known and gallant squadron leader for having thus started the ball rolling for " air-education " at Cambridge.

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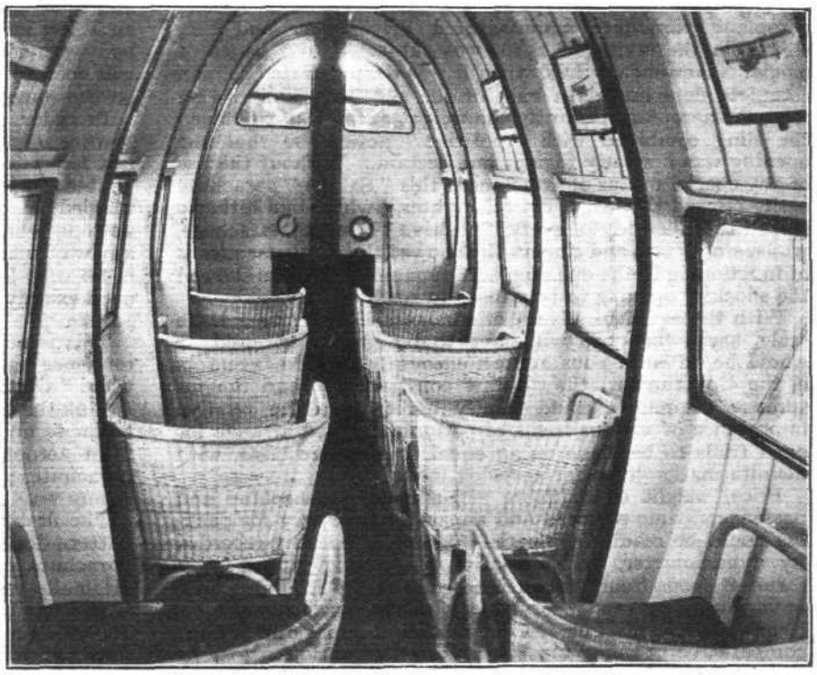
How others see us aerially is well exemplified in a message from the *Daily Telegraph* New York correspondent. From this it appears that the discussion on the Bill now before the Senate creating a Federal Department of Aeronautics to co-ordinate and supervise all military and commercial flying activities in the United States, and create a corps of 44,000 officers and men, gave Senator New, the sponsor of the measure, an opportunity of declaring that the whole course of the country's dealings in aeronautics had been absurd and devoid of credit. Because no department such as he proposed existed, Mr. New said, America's vast aeronautical effort aroused by the War had been 95 per cent. dissipated, and fliers, 'planes and aerial equipment had vanished. The few aeroplanes still possessed by America were De Havilland 4's, which were practically obsolete, and if war were declared again, the United States would not have a single pursuit 'plane, and would be obliged to depend on foreign Governments. On Armistice Day, when America had reached the peak of her production, means had been developed for turning out 12,000 air machines a year, and 15,000 aviators had been trained. Mr. New emphasised that great strides were being made by England and France in the construction of aeroplanes for their own defence and for commercial purposes, and declared that England was selling machines in every part of the world.



Interior view of the cabin of the Vickers-Vimy-Rolls aeroplane bound for Cape Town

Correspondence

[The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.]

PARACHUTES—POSITIVE AND NON-POSITIVE

[1992] In the correspondence recently published in FLIGHT relating to parachutes for use from aeroplanes, Mr. E. R. Calthrop has clearly stated the great advantage offered by "positive" opening in providing certainty of opening within a known limited fall, so that the apparatus may be relied upon to function from a small attitude.

In a previous letter Lieut.-Col. Holt most pertinently pointed out that types of "positive" opening parachutes which require to be gradually withdrawn from their case for the full length of their rigging and silk body before becoming detached from the aeroplane may be very suitable for exhibition drops under the favourable conditions of *selected types of machines flying level and under* control, but that there is a most serious danger of such an apparatus becoming entangled with or damaged by the aeroplane when its use is attempted as a means of escape from a machine that, being out of control, will probably be in a spinning dive or performing other unsuitable evolutions.

That this danger is very real is borne out by the large number of cases in which the silk bodies of such parachutes have been ripped by the tailskid of the aeroplane when tested from fast machines, even when flying under control.

But Lieut.-Col. Holt is surely mistaken in basing upon these occurrences a sweeping condemnation of all parachutes having "positive" opening. The technical disasters (fortunately only with weights and dummies) have not been due to "positive" opening, but to failure in the essential feature of instant detachment from the aeroplane. Most types of parachute that by instant detachment from the aeroplane avoid the possibility of entanglements or tearing are subject to the disadvantage of uncertain length of fall before opening, and such heavy shock when opening takes place that many silk bodies have burst during tests.

In a short article published in FLIGHT in 1918, under the pseudonym "E. Forgeron," the writer outlined the essential characteristics for a satisfactory aeroplane parachute by placing *foremost* the necessity of avoiding entanglement with the machine (as urged by Lieut.-Col. Holt), and, *secondly*, that of positive opening (as advocated by Mr. E. R. Calthrop), with other desirable features, such as small shock, light weight, easy packing and moderate price.

These essentials were practically attained by a special aeroplane parachute manufactured by Spencer and Co., which, in the spring of 1919, was subjected to a series of official Government trials, when it was demonstrated to give complete detachment in bulk of the silk body and rigging from the aeroplane instantly the weight of the load tightened the sling combined with "positive" action, so that the opening was perfectly regular and certain. Without the use of any special means of attachment this "Salvus" parachute easily cleared the fast "Bristol Fighter," which had hitherto ripped the silk body of every "positive" opening parachute, whilst stop watch and cinema film showed the regular sequence of functioning in the opening, and dynamometer tests showed the shock of opening to be unusually small.

With the eventual advent of commercial flying on a large scale, aerial lifebuoys will have to be considered, and it would be advantageous and an encouragement to inventors if the Government, the aircraft constructors, and the insurance companies could jointly agree upon the relative importance of various items of performance and arrange for open trials to be made on an equal competitive basis, with definite marks given for specified items.

Price, weight of complete attachments to machine and passengers, time required and apparatus necessary for packing could be readily compared; shock of opening recorded by dynamometer, and regularity of opening judged by a series of drops from a low height, such as 200 ft., flying level at varying speeds and recorded by stop watch and cinema film; clearance from machines by drops when climbing and diving; comparative opening and speed of fall of various types by simultaneous drops from a large machine. It might also be possible, by utilising obsolete and damaged wings (that would otherwise be scrapped) attached to light, rough frames and dropped from kite balloon, to simulate a helpless machine diving out of control, and judge the risk of entanglement.

ERNEST E. SMITH, A.M.I.Mech.E.

[1993] I sincerely hope that Col. Holt has not read any personal acrimony to himself in my letter appearing in your issue of January 15, for most certainly none was intended, and I hope sooner or later to have the pleasure of making his personal acquaintance. We are both working to one end, and my argument is directed purely *ad rem*.

In his letter in your current issue of January 29, Col. Holt mistakenly attributes to me the coining of the word "positive" in relation to the opening of the body of a parachute. My inaugural claim for my parachutes was "automatic opening," but the terms "positive opening" and "non-positive opening," originating with Major T. Orde Lees, emanated from the Parachute Section of the Air Ministry, and, being official descriptions widely understood, I have latterly used them in preference to my own earlier distinctions of "automatic" and "ordinary," *i.e.* "non-automatic," opening. I think it must be generally agreed that all parachutes, of whatever kind, size and make, must fall into one or the other of the two categories "positive" or "non-positive" opening It is a good and scientific distinction, and I cannot yet conceive of a third. Even Col. Holt's "anti-suction" parachute (to seeing which I shall look forward with interest), if it opens each time the same way, and at the same depth of fall, without variation except in ratio to load and the speed of the aeroplane, must necessarily have "positive opening" as understood by experts, whether he fancies the term or not.

Col. Holt takes exception to my use of the word "infallible" in connection with "positive opening." Unless it is infallible in its opening, a parachute is not entitled to be described as provided with "positive opening"; but to be infallible, the opening mechanism must be so simple as to be absolutely reliable in its action. I do not claim that it is impossible for any other than my "Guardian Angel" Parachutes, to have "positive opening"; but I do claim that in an eight years' search for positive opening mechanism, when others were not concerning themselves in any such problems, I have invented and patented all the simplest forms of it, and that other forms must now be necessarily more complex, and their use be attended with greater risk. If the external air is led in large volume into the interior of any parachute body provided with tangle-proof rigging, it follows that it will open to its full extent as infallibly as that a cork, tossed on the water, will float. Neither can do anything else.

In order, so it would seem, to contest the infallibility of *positive opening*, the value of which was the theme of my last letter to you, Col. Holt refers to "a bad disaster in the United States" owing to the parachute rope becoming entangled in the aeroplane's "bloater." This disaster had nothing whatever to do either with positive opening, or in any way with the parachute. The claim I made was: "There is no case known of a *positive opening* parachute failing to open exactly as it was designed to do"; and to that claim I adhere.

This is not the first occasion on which a somewhat unfair reference has been made to happenings which have occurred when "Guardian Angel" parachutes were being carried, and I think the time has come for a perfectly explicit statement to be made upon the subject. There have been *three* fatalities from aeroplanes which were carrying "Guardian Angel" parachutes; but in not one of these cases was the parachute in any way at fault.

The first casualty was due to the breakage of a standard pattern doghook of malleable iron in the rope connecting the parachute container to the aeroplane. The doghook was originally tested to one ton, and had been used a dozen times with loads heavier than that on the occasion of the accident. Examination showed that the broken arm contained a hidden flaw which was the cause of the accident. The Coroner's jury absolved all concerned from any blame. As the connection between the container and the aeroplane had thus been severed, it fell, unopened and inoperative, with the un-

fortunate parachutist. The case was at once reported by me to the Air Ministry, who immediately despatched a representative to make a full investigation of the circumstances; and it was proved that the parachute was in no way at fault.

The second casualty took place in the United States, and was a very extraordinary one; for at the enquiry which followed it was proved that the officer, who had gone up purposely to make a parachute descent, jumped from the plane without getting into his harness. As he was not connected to his parachute, it cannot be blamed for this officer's death.

The third casualty, that to which Col. Holt has specifically referred as having occurred in the United States, ought never to have happened. The accident occurred in connection with a D.H. 9 aeroplane, a type from which many successful live drops had been made in this country, but always with the elevator rocker arm shielded, so that this very accident, the possibility of which had been foreseen, could not, with the rocker arm so guarded, by any possibility take place. Although strict instructions had been given, before the party left England, that no avoidable risks were to be taken, the officer in our employ, whose death occurred, although warned of the danger, insisted upon going up without the projecting rocker arm being shielded. He was quite confident that he could clear it, and so he took this entirely unjustifiable risk. When this officer made his drop, the life-line caught in a loop around the rocker arm, and, as there was no shock-absorber between the falling load and this point of rigid resistance, the fall of 12 ft. developed a strain of 2,400 lbs., which burst his harness, out of which he fell to earth. No pull came upon the parachute, which remained undisturbed in its container. The same parachute, without reassembly, was subsequently used successfully on a later occasion. Col. Holt will, I feel sure, do me the justice to agree that in no one of these cases could the conduct of the parachute be called in question. He is at liberty to see all the documentary evidence, reports, correspondence and photographs, in connection with these cases.

In regard to Col. Holt's final remark on this last case, that "you cannot have ropes dangling in proximity to the machine without attendant risks," I entirely agree with him; and in some of my specifications I have shown methods by which the life-line is carried in a sunken groove and protected by a stripping piece or held therein by breaking cords. This has been done with the triple object of (*a*) preventing any possible error in the connection of the aviator with his parachute; (*b*) protecting the life-line from weathering, and (*c*) avoiding the flogging about of the life-line and its unnecessary head resistance. These are refinements of design not yet appreciated, or called for, by the Air Ministry. Recently I submitted to the aeronautical journals a short article entitled "The Parachute's Worst Enemy" (of which some recognised the importance and published it), pointing out the necessity, if life-saving equipment is to be taken seriously and used with the least attendant risk, of smoothing off all projections and rugosities on the *fuselage* beneath and behind the cockpits, which is not beyond the capacity of aeroplane designers to accomplish without detriment to their machines. The insurance companies who take aerial risks will eventually be provided with experts of capacity to consider and criticise, whose duty it will be to study matters of detail of this kind, and advise them as to whether they appreciably reduce risk, and if it is proved to the satisfaction of their directors that they do (of which the last case is a proof), they will take suitable action to the end that avoidable risks should be removed, or, in default, discrimination in premiums may possibly be shown against those types of machines held to be dangerous to get away from in case of disaster. It is all a matter of comparative risk, and the steady elimination of avoidable risk in the air will continue, in spite of our desperate conservatism, because it will be found to *pay*.

Because I have designed a series of different types of parachute containers with, in some cases, different kinds of "positive" opening, Col Holt writes as though he had jumped to the conclusion that this was because I had misgivings that my original standardised A1 Type would not be effectual in the actual conditions likely to arise in the case of a sudden aeroplane collapse. With his knowledge of its untarnished record in action, Col. Holt must know that this is not so. The prime duty of everyone concerned with aerial life-saving equipment is the continual elimination of avoidable risks, large and small; and in all my inventions, whatever their value, I have had the elimination of risk—*qua* man and *qua* machine—constantly before me as my incentive and prime object. In the case of the several inventions of *positive opening* and "*tangle-proof rigging*" my commercial instincts have led me to seek diligently for and to protect all alternative methods possessing the required degree of simplicity of action in order that my company should not be faced by competition, if these had been independently discovered and worked by other people. This commercial aspect, which in itself is a sufficient justification, no doubt has application to all my inventions, but my main object in working out a range of different types of containers is to make the application of parachutes always a matter of safety to meet the infinite variety of design in aeroplanes.

I started with the hope of making a standard pattern of parachute suitable for all purposes and requirements, and my original A type has proved itself as perfect in action in a great variety of circumstances as any aviator can wish for. But supposing it is desired by the aeroplane builder that the parachute should be stowed in a wide shallow metallic casing with a narrow slot mouth, would Col. Holt say that such a proposition should be cast aside because the A type positive opening was inapplicable? That particular problem, amongst many others set me by officers of the Air Board and Air Ministry, was faced and solved quite perfectly with my F type of positive opening. An entirely different problem had to be met when the *Daily Mail* did me the honour to ask me to work out a scheme for dropping heavy loads of newspapers from Handley Page machines with accuracy upon targets within a circumscribed area. To ensure the remarkable accuracy which resulted, it was necessary that these special parachutes should be provided with "positive opening" so that their trajectory should be identical in order to get good shooting. They had to be confined in narrow cubicles, and it was a condition that they had to be quite flexible, subject to compression, and without any rigid parts. It was thus that my G type "positive opening" came into being, and proved a perfect success. These are merely two examples of special adaptation to environment, and, like all my other inventions, have been developed in response to requirement, and *not*, as Col. Holt is pleased to describe them, as "just so many desperate efforts to circumvent the natural limitations of his own parachute system."

May we hear from Col. Holt again?

E. R. CALTHROP, M.Inst.C.E., M.I.Mech.E.

FLYING AND CURIOUS PHENOMENA

[1994] While discussing curious phenomena and cloud scenes with several other pilots recently, I happened to recount the following experience of my own. As no one present seemed to have heard or seen anything like it, I venture to repeat it for the benefit of the readers of FLIGHT.

I was flying at Brighton with two passengers on October 15, 1919. The weather was showery, and the sky partially overcast by rain clouds at about 3,000 ft. On reaching this height I found myself flying level with a large cloud, from which rain could be seen falling. I was in bright sunlight, between the sun and the cloud. After a short time, during which I stayed near this cloud, I noticed on one side of the machine one "arm" of a rainbow. The other arm, I saw, was on the other side. Owing to the top plane being immediately above my head, I could not see the "top" of the arc. I started to turn round in order to get further away and have a complete view, when I saw to my surprise that the "top" of the rainbow was *below*, so that it appeared inverted, with the two arms pointing upwards—a most queer effect. This lasted for two or three minutes until the rainbow faded, and was noticed by both my passengers.

I should be interested to know if any of your readers have witnessed this themselves, and if they know the scientific explanation.

Watford. H. S. BROAD, Capt.

◈ ◈

Philippine Governor-General Flies to Pacific

ONE of the first flights to be made in the Philippine Islands in a non-Governmental machine was that of the Governor-General, Mr. Francis B. Harrison, in a Curtiss Seagull. The Governor-General recently flew from Manila Bay to the Pacific Ocean and return, a total distance of almost one hundred and fifty miles. He was in the air an hour and fifty-five minutes, and reached an altitude of 7,300 ft. Mrs. Harrison and Miss Virginia Harrison also made flights.

◈ ◈

A Flying-Boat Service for Peru

PRESIDENT LEGUIA was the first passenger at the formal inauguration of the Handley Page commercial flying-boat service at Ancon on February 8, Capt. Evans piloting the machine, writes *The Times* correspondent at Lima.

After half an hour's flight over the Pacific Ocean, the President predicted a magnificent future for aviation in Peru. He declared that Peru was more adapted to, and had greater need for, aviation than any other country in the South American continent.

THE ROYAL AIR FORCE

London Gazette, January 27

Administrative Branch

Flying Officer (Hon. Flight-Lieut.) H. Pallett is graded for purposes of pay and allowances as Flight-Lieut. while employed as Flight-Lieut.; Oct. 18, 1919).

Lieut. T. F. Davis relinquishes the grading for pay and allowances as Capt. on ceasing to be employed as Capt.; July 2, 1919.

Lieutenants to be Lieutenants:—C. A. Hore, from (A.), S. Hewett, from (A. and S.); April 17, 1919.

Second Lieutenants to be Lieutenants:—A. O. Fraser; April 12, 1919. R. W. Hyde; June 20, 1919. S. Tew; July 21, 1919 (since demobilised); J. E. Carter; July 27, 1919.

Pilot Officer R. L. Raymond to be Flying Officer; Nov. 22, 1919 (since demobilised).

Sec. Lieut. J. F. Bentley to be actg. Lieut. while employed as Lieut., from March 1, 1919, to April 30, 1919.

Sec. Lieut. J. F. Bentley is graded for purposes of pay and allowances as Lieut. while employed as Lieut.; May 1, 1919.

Sec. Lieut. W. Campbell to be Sec. Lieut., from (A); May 17, 1919.

Sec. Lieut. A. N. Jackson (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut.; Nov. 14, 1918.

The following relinquish their temp. R.A.F. commns. on return to Army duty:—Flying Officer E. M. Smith (Lieut., Can. Res. Cav. R.); March 24 1919. Pilot Officer (Hon. Flight-Lieut.) F. H. Bacque (Capt., R.G., Can.); July 31, 1919. Pilot Officer (Hon. Flight-Lieut.) H. H. Toy (Capt., Can. Gen. List); Aug. 4, 1919. Flight-Lieut. J. W. Havers (Lieut., R.N.) relinquishes his temp. R.A.F. commn. on return to Naval duty; Nov. 1, 1919 (substituted for notification in *Gazette* Nov. 21, 1919).

(Then follow the names of nine officers who are transfd. to the Unemployed List under various dates.)

Lieut. F. D. McClinton relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; Jan. 8 (substituted for notification in *Gazette* Jan. 16).

The initials of Lieut. A. E. M. Jansen are as now described, and not as stated in *Gazette* Dec. 19, 1919.

The initials of Lieut. W. B. Maitland, D.S.O., are as now described, and not as stated in *Gazette* April 25, 1919.

The initials of Lieut. B. I. Ward are as now described, and not as stated in *Gazette* March 28, 1919.

The surname of Lieut. C. A. Stiles is as now described, and not as stated n *Gazette* Jan. 6.

The notification in *Gazette* Jan. 16 concerning Lieut. (actg. Capt.) W. H. Hoile is cancelled.

Technical Branch

Lieut. B. Humphrey to be actg. Capt. whilst employed as Capt., Grade (A); Dec. 3, 1918, to Jan. 19, 1919).

Flying Officer G. H. Brown is graded for purposes of pay and allowances as Flight-Lieut. whilst employed as Flight-Lieut., Grade (A), from (S.O.) Dec. 1, 1919 (substituted for notificatin in *Gazette* Dec. 23, 1919).

Sec. Lieut. J. H. Furniss to be actg. Capt. whilst employed as Capt., Grade B); Oct. 1, 1918 (substituted for notification in *Gazette* Nov. 1, 1918).

Lieut. T. Lund to be Lieut., Grade (A), from (A); Jan. 13, 1919 (substituted for notification in *Gazette* April 25, 1919).

Flying Officer G. Bowen relinquishes the grading of pay and allowances as Flight-Lieut. on ceasing to be employed as Flight-Lieut., Grade (B), Oct. 27, 1919.

Flying Officer A. W. Ellis to be Flying Officer from Unemployed List; Nov. 1, 1919, with prec. next below Flying Officer J. E. Blair.

Sec. Lieut. F. C. North to be Lieut., Grade (A); June 12, 1919 (since granted short service commn.).

Sec. Lieut. C. H. N. Nunn to be Lieut., Grade (B); Jan. 2, 1919 (since granted a short service commn. as Flying Officer).

Second Lieutenants to be Lieutenants without pay and allowances of that rank:—(Hon. Lieut.) J. W. Harling (since re-classified to Admin.); April 2, 1918 (substituted for notification in *Gazette* July 29, 1919). C. S. Goode; July 7, 1919 (substituted for notification in *Gazette* Nov. 14, 1919).

Sec. Lieut. S. F. Coleman to be Sec. Lieut., Grade (A), from (A'ship), July 7, 1918.

Lieut. F. A. Swoffer relinquishes his commn. on ceasing to be employed and is permitted to retain his rank; Nov. 8, 1919.

(Then follow the names of 24 officers who are transfd. to the Unemployed List under various dates.)

The initials of Lieut. (actg. Capt.) B. R. Bostock are as now described and not as stated in the *Gazette* of Jan. 16.

The initial of Sec. Lieut. K. Smith is as now described, and not as stated in the *Gazette* of Nov. 4, 1919.

Medical Branch

Flight-Lieut. J. E. Dunbar, M.D. (Capt., R.A.M.C. (T.F.)) relinquishes his temp. R.A.F. commn. on return to Army duty; May 27, 1919.

(One officer transfd. to the Unemployed List.)

Dental Branch

D. Blair is granted a temp. commn. as Flight-Lieut.; Jan. 26.

Memoranda

(Then follow the names of five cadets granted hon. commns. as Sec. Lieuts.)

Group Capt. T. B. Wood, C.M.G. (Col., Active List, R.A.), relinquishes his temp. R.A.F. commn. on return to Army duty; Dec. 1, 1919.

(One officer transfd. to the Unemployed List.)

London Gazette, January 30

The following officers have been granted short service commns. in the ranks stated. Except where otherwise stated, the commns. will have effect from Jan. 30, and the officers will retain their seniority in the substantive rank last held by them prior to the grant of the short-service commn.

In the case of officers now gazetted Flying Officer or Obs. Officer, from Pilot Officer, seniority will date from the date of *Gazette*:—

Flight Lieut. (from Hon. Flying Officer).—F. J. W. Hedgcock (T.) (with effect from Aug. 20, 1919).

Flying Officers.—A. Bottoms (A.), P. Colbeck, M.B.E. (Ad.), C. V. Frith (A.), R. J. P. Grebby, D.F.C. (A.), E. J. Leech (T.), R. D. C. Palmer (A.), R. Sterling, D.F.C. (A), F. Wright (A).

Observer Officer.—H. Hutchinson.

Flying Officers (from Pilot Officers).—A. Knox (A.), M. H. Tisdall (A).

Observer Officers (from Pilot Officers).—W. B. Mortimer, J. H. Vickers.

The notifications appearing in the *Gazettes* of the dates indicated below, appointing the following officers to short-service commns., are cancelled:—Flying Officer W. F. Hamilton (A.); Oct. 24, 1919. Flight-Lieut. P. W. Snell, A.F.C. (A.), Flying Officer H. C. Price (A.), Flying Officer J. H. Shaw (A.); Dec. 5, 1919. Flying Officer E. T. H. Ellis (A.); Flying Officer H. W. Gill (A. and S.); Flying Officer D. G. R. Lord (A.), Flying Officer A. Miller (A.), Flying Officer R. M. Rankin (A.), Flying Officer B. E. S. Smith (A.), Obs. Officer A. H. Darnbrough, Obs. Officer A. D. Sinclair; Dec. 12, 1919 Flying Officer J. L. Bernard (A.); Dec. 19, 1919.

Permanent Commissions

Flight-Lieut. C. P. O. Bartlett, D.S.C. (A.), is granted a permanent commn in the rank stated; Jan. 26.

The notification in the *Gazette* of Aug. 1, 1919, appointing Lieut. F. Wood (A.) to a permanent commn. is cancelled.

The initials of Lieut. M. G. S. Burger, D.F.C. (A.), are as now described, and not as stated in the *Gazette* of Jan. 23.

The following temporary appointment is made at the Air Ministry:—

Staff Officer, 1st Class.—(T.) Sqdn. Leader B. H. N. H. Hamilton, D.S.O. Oct. 1, 1919.

The following temporary appointment is made:—

Staff Officer, 1st Class.—(T.) Wing Cdr. C. R. J. Randall, C.B.E.; Jan. 21

Flying Branch

Flight-Lieut. M. A. J. Orde to be Flight-Lieut. (A.), from (T.); Dec. 30, 1919.

Flight-Lieut. W. B. Callaway, A.F.C., to be Flight-Lieut. (S.), from (S.O.); Oct. 31, 1919.

Lieuts. to be actg. Capts. whilst employed as Capts. (A.):—L. E. G. Hawkins, from Sept. 18, 1918, to Jan. 21, 1919; A. L. Fiddament, from Nov. 1, 1918, to April 30, 1919 (substituted for notification in the *Gazette* of Feb. 4, 1919).

The following relinquish their temp. R.A.F. commns. on return to Army duty:—Flying Officer L. McC. Ritchie (Lieut., N. Brunswick R.); Dec. 8, 1918. Pilot Officer (Hon. Flying Officer) F. R. Knight (Lieut., Sask. R.); Jan. 10, 1919. Wing Comdr. J. R. C. Heathcote (Maj., Cam. Highrs.); Jan. 12. Flying Officer G. Milner (Capt., Quebec R.); Jan. 13, 1919. Pilot Officer R. A. Ritchie (Lieut., 68th R. Can.); Jan. 15, 1919. Pilot Officer H. Inman (Lieut., Manch. R., T.F.); June 17, 1919. Flying Officer T. K. Burton (Lieut., Sco. Rif.); Jan. 21. Flying Officer L. A. Powell, M.C. (Lieut., Glouc. R.); Jan. 22.

The following relinquish their temp. R.A.F. commns. on reversion to I.A.R.O.:—Fight-Lieut. F. H. Mardall (Capt., I.A., 41st Dogras); Flying Officer (Hon. Flight-Lieut.) A. M. R. Montagu (Capt., I.A.R.O.); Jan. 23.

(Then follow the names of 24 officers who are transfd. to the Unemployed List under various dates.)

Capt. S. W. Clift (Lieut., R.G.A., T.F.) relinquishes his commn. on account of ill-health; Jan. 19.

Lieut. E. G. Weller relinquishes his commn. on account of ill-health (caused by wounds) and is permitted to retain his rank; Jan. 9 (substituted for notification in *Gazette* of Nov. 25, 1919).

Sec. Lieut. (Hon. Lieut.) W. Cooke relinquishes his commn. on account of ill-halth (contracted on active service), and is permitted to retain rank of Lieut.; July 18, 1919.

Sec. Lieut. C. L. Startup relinquishes his commn. on account of ill-health (contracted on active service), and is permitted to retain his rank; Jan. 23.

The notification in *Gazette* of Sept. 9, 1919, concerning Sec. Lieut. G. J. Cross is cancelled. (Notification in *Gazette* of July 18, 1919, to stand.)

The notification in *Gazette* of July 11, 1919, concerning Lieut. H. F. Birchal, D.F.C., is cancelled. (Notification in *Gazette* of Aug. 8, 1919, to stand.)

The notification in *Gazette* June 27, 1919, concerning Sec. Lieut. J. C. Campbell is cancelled (notification in *Gazette* July 15, 1919, to stand).

The notification in *Gazette* Nov. 18, 1919, concerning Lieut. E. C. K. Kingston is cancelled.

Administrative Branch

Sqdn. Leader G. J. Watney, O.B.E., to be Sqdn. Leader, from (S.O.); Jan. 15.

Flying Officer W. H. D. Phillips relinquishes grading for pay and allowances of Flight-Lieut. on ceasing to be employed as Flight-Lieut.; Dec. 30, 1919.

Pilot Officer C. D. Wooldridge (Lieut. (actg. Capt.), Hamps. R., T.F.) relinquishes his temp. R.A.F. commn. on return to Army duty; July 17, 1918.

(Then follow the names of 17 officers who are transfd. to the Unemployed List under various dates.)

The notification in *Gazette* Sept. 26, 1919, concerning Capt. J. H. N. H. Burke is cancelled (notification in *Gazette* Oct. 7, 1919, to stand).

The notification in *Gazette*, Sept. 12, 1919, concerning Sec. Lieut. E. Bentley is cancelled.

The notification in *Gazette* Jan. 9 concerning Sec. Lieut. S. O. Clarke is cancelled (notification in *Gazette* Nov. 21, 1919, to stand).

Technical Branch

Sec. Lieut. (actg. Lieut.) J. Smallbone to be actg. Capt. while employed as Capt., Grade (A.), from June 1, 1918, to Feb. 25, 1919 (since demobilised).

Pilot Officer J. M. Knight, M.B.E. (Sec. Lieut., Ex-Reg. Employed List), relinquishes his temp. R.A.F. commn. on return to Army duty; Oct. 24, 1919.

(Then follow the names of 25 officers who are transfd. to the Unemployed List under various dates.)

The initials of Lieut. W. J. Metcalfe are as now described, and not as stated in the *Gazette* of April 18, 1919.

The notification in the *Gazette* of Jan. 20 concerning Capt. E. Parker (E. Lancs. R. (S.R.)) is cancelled.

The notification in the *Gazette* of Nov. 28, 1919, concerning Lieut. F. A. Swoffer, M.B.E., is cancelled.

Memoranda

(Then follow the names of seven Overseas Cadets granted temp. commns. and 23 Cadets granted hon. commns. as Sec. Lieuts., also three officers transfd. to the Unemployed List.)

Lieut. A. J. Somers relinquishes his commn. on account of ill-health (contracted on active service), and is permitted to retain his rank; Jan. 23.

London Gazette, February 3

The notifications in the *Gazette* of Aug. 1, 1919, appointing the following Lieuts. to permanent commns. are cancelled:—S. G. Frogley (A.), G. R. Travis (A.).

The following temporary appointment is made:—

Staff Officer, 3rd Class.—(Q.)—Flight-Lieut. F. H. Songhurst, M.B.E.; Jan. 10.

Flying Branch

Flight-Lieut. T. Hinshelwood, D.S.C., D.F.C., to be Flight-Lieut. (A.), from unemployed list; Jan. 4, with prec. next below Flight-Lieut. J. H. D'Albiac, D.S.O.

Lieut. L. E. G. Hawkins, to be actg. Capt. whilst employed as Capt. (A.), from Sept. 18, 1918, to Jan. 21, 1919 (substituted for notification in the *Gazette* of Jan. 27).

Second Lieutenants to be Lieutenants.—C. J. E. Malet-Veale (since demobilised); June 18, 1918. F. B. Morris (since demobilised); July 30, 1919.

Pilot Officers to be Observer Officers.—G. E. McManus (since demobilised), A. W. Robinson; Aug. 12, 1919. H. L. Carter; Oct. 25, 1919.

P.F.O. F. N. Underwood (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (A.); May 29, 1918 (since killed).

Sec. Lieut. H. F. Monypeny (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (A.); Sept. 27, 1918.

Can. Cadet E. J. Smith is granted a temp. commn. as Sec. Lieut. (A.); Oct. 17, 1918.

The following relinquish their temp. R.A.F. commns. on return to Army duty:—Pilot Officer (Hon. Flying Officer) J. L. Gilmour (Lieut., W. Ont. R.); Dec. 9, 1918. Pilot Officer (Hon. Flying Officer) T. C. W. Haynes (Lieut., Manch. R.); March 25, 1919. Flying Officer G. Wadden (Lieut., R. Ir. Fus.); Nov. 17, 1919.

The following Lieuts. relinquish their commns. on ceasing to be employed: L. W. White; June 13, 1919. G. D. V. Russell; Sept. 20, 1919.

(Then follow the names of 35 officers who are transfd. to the Unemployed List under various dates.)

Capt. F. G. Wilson relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Jan. 30.

Capt. E. T. Owles, M.C. (Lieut., R. Ir. Fus.), relinquishes his commn. on account of ill-health caused by wounds; Jan. 23.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—J. A. V. Boddy (caused by wounds); Dec. 10, 1919. A. E. Reed, D.F.C. (caused by wounds); Jan. 11. A. C. S. Buist, M.C. (contracted on active service); Jan. 27.

The initials of Lieut. J. I. Maitland are as now described, and not as stated in *Gazette* Jan. 16.

The initials of Sec. Lieut. A. H. F. Brothers are as now described, and not as stated in *Gazette* July 30, 1918.

The surname of Sec. Lieut. G. G. H. Du Boulay is as now described, and not as stated in *Gazette* Dec. 30, 1919.

The notifications in *Gazette* May 27, 1919, and Nov. 18, 1919, concerning Sec. Lieut. T. Q. Harvey are cancelled.

The notification in *Gazette* July 18, 1919, concerning Lieut. A. D. M. Lewis is cancelled.

The notification in *Gazette* Oct. 28, 1919, concerning Sec. Lieut. J. E. Phelps is cancelled.

The notification in *Gazette* Nov. 11, 1919, concerning Lieut. F. Neale is cancelled.

The notification in *Gazette* Jan. 6 concerning Lieut. N. S. Dewey, M.C., is cancelled.

Administrative Branch

Flying Officer (Hon. Flight-Lieut.) A. M. Watson, M.B.E., relinquishes the grading for pay and allowances as staff officer, 3rd Class (P.), on ceasing to be employed as Camp Comdt.; Jan. 19.

Second Lieutenants to be Lieutenants.—H. S. Harwood; Nov. 24, 1918 (since demobilised); A. N. Jackson; April 25, 1919 (since demobilised).

Pilot Officer F. H. H. Twelvetree to be Flying Officer; Oct. 1, 1919.

Sec. Lieut. W. J. Wreford to be Sec. Lieut., from (O.); March 3, 1919 (substituted for notification in *Gazette* March 18, 1919.

Flying Officer D. L. P. S. Stuart-Shepherd, D.F.C. (Lieut., E. Lancs. R.), relinquishes his temp. R.A.F. commn. on return to Army duty; Jan. 3.

Capt. G. A. Revington (Lieut., R.N.) relinquishes his temp. R.A.F. commn. on return to Naval duty; July 11, 1919.

(Then follow the names of 13 officers who are transfd. to the Unemployed List under various dates.)

Capt. W. E. Horan (T.F., Gen. List) relinquishes his commn. on account of ill-health (contracted on active service); Jan. 23.

Capt. J. A. Hartcup (E. Yorks. R.) relinquishes his commn. on account of ill-health (contracted on active service); Feb. 2.

The name of Lieut. E. H. McEnery is as now described, and not Lieut. E. H. McEnery, M.C., as stated in *Gazette* Jan. 6.

The notification in the *Gazette* of Oct. 24, 1919, concerning Capt. E. E. R. Heathcote is cancelled (notification in the *Gazette* of Aug. 19, 1919, to stand).

The notifications in the *Gazettes* of June 27, 1919, Nov. 14, 1919, and Nov. 25, 1919, concerning Capt. G. A. Revington (Lieut., R.N.) are cancelled.

Technical Branch

Capt. R. Collis to be Capt., Grade (A.), from (A.); March 14, 1919.

Lieut. H. C. G. Allen to be Lieut., Grade (A.), from (S.O.); May 1, 1919 (substituted for notification in the *Gazette* of May 16, 1919).

Sec. Lieut. (Hon. Lieut.) M. A. Doyle to be Lieut.; April 1, 1918 (substituted for notification in the *Gazette* of Nov. 25, 1919).

Sec. Lieut. G. Barfoot-Saunt to be Lieut. Grade (A.); April 2, 1918; (without pay and allowances of that rank prior to July 1, 1918).

Pilot Officers to be Flying Officers.—W. J. Coadwell, Grade (A.) (substituted for notification in the *Gazette* of Nov. 4, 1919) (notification in the *Gazette* of Sept. 12, 1919, to stand). W. G. Kentfield (notification in the *Gazette* of May 27, 1919, to stand); Oct. 1, 1919.

Flight-Lieut. L. E. Palmer, O.B.E. (Capt., York and Lancs. R.), relinquishes his temp. R.A.F. commn. on return to Army duty; Jan. 26.

Flying Officer J. W. Lawlor (Lieut., R.A.S.C.) relinquishes his commn. on ceasing to be employed; Sept. 15, 1919 (substituted for notification in the *Gazette* of Dec. 30, 1919).

(Then follow the names of 34 officers who are transfd. to the Unemployed List under various dates.)

The following Sec. Lieuts. relinquish their commns. on account of ill-health (contracted on active service), and are permitted to retain their rank:—F. S. Beamish; Jan. 24. I. F. A. Klapper; Jan. 29.

The rank of Lieut. J. E. Tyrrell is as now described, and not as stated in *Gazette* Jan. 9.

The surname of Lieut. R. H. Whittington is as now described, and not as stated in *Gazette* Nov. 11, 1919.

The initials of Flying Officer R. O. C. Bush are as now described, and not as stated in *Gazette* Jan. 13.

The notification in *Gazette* June 27, 1919, concerning Sec. Lieut. A. H. Knight is cancelled.

The notification in *Gazette* Oct. 3, 1919, concerning Lieut. J. W. Southwell-Lawlor is cancelled.

The notification in *Gazette* Dec. 16, 1919, concerning Flying Officer W. J. Coadwell is cancelled.

Medical Branch

Flight-Lieut. (actg. Sqdn. Ldr.) J. J. C. Hamilton to be actg. Wing Comdr. whilst employed as Wing Comdr.; Jan. 17.

Flight-Lieut. H. Gardiner-Hill, M.B.E., to be actg. Sqdn. Ldr. whilst employed as Sqdn. Ldr.; Sept. 1, 1919.

(Three officers transfd. to the Unemployed List.)

Chaplains' Branch

The Rev. F. H. Wheeler D.S.O, relinquishes his commn. on ceasing to be employed; Jan. 31.

(One officer transfd. to the Unemployed List.)

Memoranda

(Then follow the names of six Overseas Cadets granted temp. commns. and 16 Cadets granted hon. commns. as Sec. Lieuts.)

Flight-Lieut. G. J. C. Maxwell, M.C., D.F.C., A.F.C., is placed on the half-pay list; Feb. 1.

Flying Officer (actg. Flight-Lieut.) K. A. C. Creswell, M.B.E. (Lieut. (Temp. Capt.) Gen. List, Army,) relinquishes his temp. R.A.F. commn. on return to Army duty; July 25, 1919.

The following Temp. Hon. Capts. relinquish their commns. on ceasing to be employed:—A. Boor; Feb. 28 1919. G. T. S. Clarke; May 16, 1919. (Hon. Maj.) H. P. Philpot; June 7, 1919. A. N. Barrett, H. E. Fozard, M.B.E., E. L. Mann (actg. Hon. Maj.) H. Myers, W. H. Nicholl, G. Ramage, M.B.E., K. Robertson (Hon. Maj.) A. A. Ross, O.B.E., P. W. Smith, O.B.E., W. J. Spencer, A. E. Steel, W. A. Thain, L. Warner; Jan. 15.

The following Temp. Hon. Lieuts. relinquish their commns. on ceasing to be employed:—H. B. Hitch; Dec. 16, 1918. A. Burn, E. A. Willder; Dec. 31, 1918. H. J. Hewlett, F. S. Holder. H. Tanner; Jan. 16, 1919. W. L. Macfie; Jan. 31, 1919. J. E. Haswell; Feb. 5, 1919. P. W. A. H. Beatty, S. Birley, J. Kelly, J. M. Munro; Feb. 16, 1919. R. E. Cragg; March 1, 1919. G. Clempson, P. C. Dick, A. M. Menell, D. Weir, D. Wilson; March 16, 1919. C. W. Stevens; March 31, 1919. H. H. Gruning; April 16, 1919. E. C. Green; May 7, 1919. R. S. Felgate, H. L. Tomlinson, V. C. Young; May 16, 1919. B. C. Hawkridge; May 17, 1919. L. W. Atcherley, E. Crowe, R. W. Fieldwick; July 16, 1919. A. V. Houghton, O. R. Wickham; Aug. 16, 1919. H. Turner; Aug. 31, 1919. C. L. Sherratt, E. H. Wilson; Sept. 16, 1919. P. H. Ball, B. H. Hogsden; Oct. 16, 1919. L. S. Rudman; Oct. 18, 1919. P. B. Ashdown, G. J. Aylin, R. H. Bailey, G. Bailey, H. E. Brackenboro, M.B.E., C. V. Brearey, J. D. Campbell, T. Caplen, W. V. H. Capps, J. H. Davies, W. Evans, R. G. Green, E. S. Hallett, P. H. Harrower, C. E. Head, E. C. Head, E. H. Henderson, H. Hey, F. H. Hodson, C. H. Howell, H. F. Howell, A. E. M. Hunn, R. W. Kennedy, H. H. Lewis, A. MacFarlane, A. E. Marsden, A. J. Marshment, S. N. S. Mee, J. O. Meyer, W. G. Meyer, (Hon. Capt.) H. C. Myers, C. Newbald, F. R. Offiler, J. D. Parkes, (Hon. Capt.) W. Parr, M. Paterson, J. H. Paton, H. S. Polyblank, E. L. Ransome, T. Reynolds, W. E. Rogan, T. Rowntree, G. R. Rudorf, P. W. Savage, F. D. Scott, E. W. Short, R. W. Sloley, J. Smeaton, P. Stevens, H. H. Stoodley, R. Thorpe, C. H. Vickers, T. Walker, R. J. Ward, E. A. Wraight; Jan. 15. (Hon. Capt.) W. F. Collins, C. J. Lyth; Jan. 16.

(One officer transfd. to Unemployed List.)

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SIDE-WINDS

CONSIDERABLE interest is being aroused in South Africa by the arrival of the Handley Page aeroplanes, and several enterprising cities, such as Bloemfontein, Durban and East London are preparing aerodromes in order to be linked up with the air routes which are to be started. In order to demonstrate the reliability with which passengers, mail or freight can be carried over long distances, a Handley Page aeroplane will shortly fly from Cape Town to Johannesburg, and the machine will return along the coast, alighting at East London and Port Elizabeth. South African business men are enthusiastic over the institution of scheduled air services, the reliability of which will be assisted by meteorological and wireless stations.

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THE Handley Page aeroplane which has been successfully demonstrating in Spain flew back to Cricklewood recently from the Sunny South. Amongst the pilot's most amusing experiences in Spain was the utilisation of teams of bullocks to pull his machine into position on the aerodrome. The animals were quite docile when the engines were not running, but they became so terrified at the roar of the Rolls-Royce that no form of persuasion could drive them near the aeroplane.

DESPITE the wind and rain storms, the trial in Pekin of the first big Handley Page aeroplane purchased by the Chinese Government was a striking success. Early in the afternoon a tremendous gale swept across the aerodrome, and it was not advisable to pull the machine from the hangar, for fear of the wind turning it over. Taking advantage of a sudden lull in the storm, however, the machine was brought out, the engines were running in eight minutes, and the aeroplane rose steadily in the teeth of the strong wind, greatly to the astonishment of the spectators, who could not conceive that a modern aeroplane was capable of flying under such conditions. Work is rapidly proceeding with the second machine, which will shortly be ready for flight.

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FROM the Haywood Foundries, Ltd., comes a little booklet containing a selection of micro-photographs showing the results obtained by this firm with non-ferrous metals. The yield point, ultimate stress, elongation, Brinell reading are given with each example, together with a few details as to the most suitable metal for any particular work.

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ONCE more Smith's instruments are taking their part in an epoch-making achievement. The Vickers-Vimy Rolls

which has been dispatched by *The Times*, and which is piloted by Capt. S. Cockerell and Capt. F. C. Broom, D.F.C., is equipped with the following Smith instruments:—Engine revolution indicators; two types of air-speed indicators—one registering in miles and the other in knots; an altitude recorder; special thermometers—for recording the heat of the oil and the radiators; a time of trip clock; and K.L.G. plugs F12. In the pilot's own story, frequent reference is made to the admirable performance of these instruments.

THE Vickers-Vimy bombing machine purchased by the South African Government, which left Brooklands on Wednesday February 4, and which is flying to Cape Town, taking the same route as Capt. Cockerell *via* Cairo, is also fully equipped with Smith instruments and accessories, including in addition to those mentioned above, an eight-day aviation watch; two Husun compasses, type No. 253; and the Smith aviation safety belt.

ANOTHER machine flying the route to Cape Town—the Airco 16, piloted by Lieut. Cotton and Lieut. McIntosh, which left Hendon on February 6—is also fully equipped with the Smith instruments and accessories, and the famous K.L.G. plugs. A specially important fitment is the Smith recording air speed indicator, and the pilots concerned will provide Messrs. S. Smith and Sons (M.A.), Ltd., with a complete set of charts showing the speed of the machine over the entire journey.

THE fact that these instruments and accessories are again chosen for use in long-distance flights proves conclusively their reliability and dependability.

MESSRS. VACUUM OIL CO., LTD., advise us that the price list of Gargoyle Mobiloils dated January 15 last is now cancelled. The new prices came into effect on February 5. Increases are as follows:—Gargoyle Mobiloil B and Gargoyle Mobiloil BB, 9d. per gallon, 5d. per half gallon, 3d. per quart. Gargoyle Mobiloil A, 6d. per gallon, 4d. per half-gallon, 2d. per quart. Other grades same price as Gargoyle Mobiloil A.

PUBLICATIONS RECEIVED

Aerial Services and Passenger Flights. Cambridge School of Flying, and Aerodrome, Ltd., 2, Downing Street, Cambridge.

"The Magnet of British Commerce." Official Guide to Nottingham, Its Commerce and Industries. The Industrial Development Department, Guildhall, Nottingham.

Calendar, 1920. The British Piston Ring Co., Ltd., Holbrook Lane, Coventry.

1920 *Calendar with Six Coloured Illustrations by Lawson Wood.* Brown Bros., Great Eastern Street, E.C. 2.

Office Desk Blotting Pad and Memorandum Block. Gaston Ltd., 212-214, Great Portland Street, W. 1.

The New Hazell Annual and Almanack, 1920. London: Henry Froude and Hodder and Stoughton. Price 6*s.* net.

Résumé des Principaux Travaux Exécutés pendant la Guerre au Laboratoire Aérodynamique Eiffel, 1915-1918. By G. Eiffel. Paris: Librairie Aéronautique, 40, rue de Seine.

Report No. 49. *Metering Characteristics of Carburettors.* The National Advisory Committee for Aeronautics, Washingpon, D.C., U.S.A.

Desk Calendar for 1920. Edgar Allen and Co., Ltd., Imterial Steel Works, Sheffield.

The "Pilot" Desk Calendar Memo-Tablet, 1920. Cellon, Ltd., 22, Cork Street, London, W. 1.

Model Aeroplanes. By F. J. Camm. London: Cassell and Co., Ltd. Price 1*s.* 6*d.* net.

The Great War in the Air. Vols. I and II. By Edgar Middleton (late R.N.A.S. and R.A.F.). With an Introduction by Brig.-Gen. Lord Montagu of Beaulieu, C.S.I., V.D. London: The Waverley Book Co., Ltd., 96, Farringdon Street, E.C.4. Price per volume, 12*s.* 6*d.* net.

Blotting Book. Cellon, Ltd., 22, Cork Street, W.1.

The Design of Screw Propellers for Aircraft. By Henry C. Watts, M.B.E., B.Sc. London: Longmans, Green and Co., Ltd. Price 25*s.* net.

Calendar 1920—*"Postscripts."* S. T. Robson, Ltd., 275-277, Coventry Road, Birmingham.

The Design and Stability of Streamline Kite Balloons. By Capt. P. H. Sumner, R.A.F. London: Crosby Lockwood and Son. Price 10*s.* 6*d.* net.

Desk Calendar, 1920. The British Rawhide Belting Co., Ltd., Hythe Road, Willesden, London, N.W. 10.

All the World's Aircraft, 1919. Edited by C. G. Grey. London: Sampson Low, Marston and Co., Ltd. Price £2 2*s.* net.

Applied Aerodynamics. By Leonard Bairstow, F.R.S., C.B.E. London: Longmans, Green and Co. Price 32*s.* net.

IMPORTS AND EXPORTS, 1919-1920

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912; for 1912 and 1913, see "FLIGHT" for January 17, 1914; for 1914, see "FLIGHT" for January 15, 1915; for 1915, see "FLIGHT" for January 13, 1916; for 1916, see "FLIGHT" for January 11, 1917; for 1917, see "FLIGHT" for January 24, 1918; for 1918, see "FLIGHT" for January 16, 1919; and for 1919, see "FLIGHT" for January 22, 1920.

	Imports.		Exports.		Re-Exportation.	
	1919.	1920.	1919.	1920.	1919.	1920.
	£	£	£	£	£	£
January ...	555,989	2,323	57,571	32,752	—	697

NEW COMPANY REGISTERED

AUTO CONSULTING AND ENGINEERING CO., LTD., Ulster Chambers, 168, Regent Street, W.1.—Capital £5,000, in 3,500 pref. shares of £1 each and 30,000 ordinary shares of 1*s.* each. Aeroplane, automobile and consulting engineers, etc. First directors: Maj. G. K. Field, A. T. Patterson.

AERONAUTICAL PATENTS PUBLISHED

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published February 12, 1920

16,835. T. E. RICHARDS. Hangars, etc. (137,548.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published February 12, 1920

8,437. T. E. RICHARDS. Hangars, etc. (137,551.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published February 12, 1920

1,089. T. H. GODWIN. Parachutes. (137,595.)
3,716. G. H. THOMAS and G. S. WILKINSON. Power transmission. (137,642.)
6,857. O. MORIZE. Propulsion of aeroplanes, etc. (124,736.)
8,229. C. E. CARDEN. Wind-screens or windows for aircraft, etc. (137,697.)
17,974. O. S. STILES. Telephone lead for kite balloons, etc. (137,762.)
23,132. H. G. DEBNAM. Rotary I.C. engines. (137,786.)

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